THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · Railway Official Gazette

PUBLISHED EVERY FRIDAY
AT
33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"
Telephone No.: WHITEHALL 9233 (6 lines)

Annual subscription payable in advance and postage free:
British Isles and Abroad .....£2 5s. 0d.
Single Copies .....One Shilling
Registered at the General Post Office, London, as a Newspaper

VOL. 74 No. 23 FRIDAY, JUNE 6, 1941

CONTENTS

DIESEL RAILWAY TRACTION SUPPLEMENT

The June issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price* 1*s.*

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 *of* 1940, *and No.* 359 *of* 1941

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:—

Mondays to Fridays - 9.30 *a.m. till* 5.0 *p.m.*

The office is closed on Saturdays

Railway Costs and National Policy

TWO recent events which have a direct reaction on railway costs raise in practical form the policy of cost stabilisation which was enunciated by the Chancellor of the Exchequer in his recent Budget speech. The first is the increase of 4s. a week in railwaymen's wages effective from January 6, and the second is the rise in the price of coal by 10d. a ton from the beginning of June. Sir Kingsley Wood said he was prepared to subsidise to minimise the impact of increased costs, particularly in transport, coal, gas, and electricity charges. He qualified this policy by excluding increases in prices resulting from advances in wage rates, and in the matter of public utility charges, including railway rates and fares, the Chancellor said he was examining the question of how far the Exchequer might assist in averting further increases. It may be argued that both the adjustments recently announced are specifically excluded from the operation of Exchequer assistance by the Chancellor's qualification. Rises in the prices of both transport and coal have widespread repercussions and are cumulative in their effects. A rise in the price of coal must increase railway operating costs, and since transport costs are an important element in determining the general price level, the principle of subsidising essential goods and services must shortly face its first real test.

* * * *

War Damage Scheme Negotiations

In the House of Commons on May 29 the Chancellor of the Exchequer announced that he had framed the general lines of a scheme to cover war damage to public utility companies, but that before introducing legislation it was necessary that he should be assured of the practicability of certain aspects of it. He was, therefore, asking representatives of the principal public utility groups to meet his advisors to assist in some of these matters. The pending legislation will cover railway companies, and Sir Kingsley Wood circulated an outline of the scheme he had in mind. The main points of this were that the Treasury would bear half the cost of war damage suffered by public utility undertakings and that the other 50 per cent. would be borne by the undertaking under a mutual sharing scheme for which purpose they would be classified into groups. It is proposed that both movable and immovable property will be covered and that damage up to August 31, 1941, will be eligible for compensation. Contributions are to be payable in four annual instalments beginning in July, 1942. After the war, when the extent of the damage is known, the War Damage Commission will consider whether any groups of public utilities should contribute less than 50 per cent. of the cost of making good the damage. Normally payments for damage will be the actual cost of repairs, exclusive of improvements, but when buildings or plant are damaged beyond repair replacement cost will be allowed, less a deduction for depreciation. The Chancellor's announcement is given in full at page 638.

* * * *

Canadian Railway Interests in Air Lines

In 1919 the Canadian Pacific Railway was authorised to engage in air transport subject to the provisions of the appropriate legislation and the regulations of the authority provided by law. In 1930 the C.P.R. and the C.N.R. each acquired $250,000 of the capital stock of the Canadian Airways, and the President of each railway joined the board of directors of that company. The company was then controlled by the late James Richardson, and is still controlled by the Richardson Estate. In 1940 the C.P.R. acquired some additional treasury stock of the Canadian Airways, but none of the Richardson stock. Mention was made at the C.P.R. annual meeting on May 5, 1937, of the failure of negotiations concerning C.P.R. participation in Transcanada Air Lines. Recently in order to provide air traffic connections with that railway, and to remedy the competitive air transport situation in Western Canada, the C.P.R. has acquired a majority interest in Mackenzie Air Service Limited, Yukon Southern Air Transport Limited, Starratt Airways & Transportation Limited, and Ginger Coote Airways Limited, and is now engaged in reorganising their operations under their

former executives and managers. None of these companies is engaged in services which are competitive with those of Transcanada Air Lines, but they perform valuable complementary functions both to the services of that company and those of the Canadian Pacific Railway.

* * * *

The Brooklyn-Manhattan Transit Corporation

The seventeenth annual report of the Brooklyn-Manhattan Transit Corporation covers the period to June 30, 1940, and is of particular interest since it marks the conclusion of the operating life of the corporation. As was explained in THE RAILWAY GAZETTE of July 26, 1940, during June of that year the Board of Transportation of the City of New York took over the property of the Brooklyn-Manhattan Transit Corporation which, through its subsidiary, the New York Rapid Transport Corporation, worked 293 track miles of rapid transit lines as well as 437 track miles of tramway line operated through the Brooklyn & Queens Transit Corporation, which in turn is a subsidiary of the New York Rapid Transport Corporation. The assets owned by the Brooklyn-Manhattan Transit Corporation are now principally cash and securities, and real estate bonds and mortgages. All the operating properties of the corporation and its subsidiaries have been transferred to the City of New York. The liquidation of the corporation will necessarily extend over a considerable period, for some of the largest assets are of a kind that cannot be realised promptly. It is satisfactory to note that after allowance for undetermined items the total unification expenses to be borne by the corporation will be approximately $400,000 less than the original estimate. A similar over-estimate has apparently been made in the case of the Brooklyn & Queens Transit Corporation, so there will be economy of no less than $800,000 on the total unification expenses.

* * * *

Freight Air Services in the U.S.A.

Apart from special conditions favouring air transport, such as passage across water, competition between railway and air services so far has been principally in the sphere of high-speed passenger transit. From airport to airport aircraft of course have an outstanding advantage in the matter of speed, but this is severely reduced by terminal delays over the section between town centre and airport, especially on medium length journeys. A new departure in air transport is envisaged by the first informal application in the U.S.A. to operate transcontinental air lines exclusively for the carriage of freight, which was filed recently with the U.S.A. Civil Aeronautics Board. This " notice of intention " was deposited by the American Air Freight Corporation, a newly-formed Californian company, which has informed both the C.A.B. and the other air line companies that it proposes to make " studies and surveys of the potentialities of the transportation of freight by air " on three transcontinental routes and one north-south route running from the Mexican border to Minneapolis, Minn. Upon completion of its studies, the company intends to ask the C.A.B. for a certificate of necessity and convenience, permitting it to operate these routes or any other shown to be feasible. A spokesman for the new company made it clear that there is no intention of filing a formal application in the near future. As much as two years may be required for surveying routes, developing suitable aircraft for freight work, and evolving ground pick-up-and-delivery service.

* * * *

Level Crossing Elimination in New York

Virtual completion of the 13-mile West Side Improvement programme, initiated in New York by the New York Central System in 1925, was marked on March 31 by the closure of the 17th street freight yard and the tracks connecting it with the 33rd street yard laid along Tenth Avenue, New York. The last scheduled movement of freight on the surface of the New York City street left the 17th street yard at 10.30 a.m. on March 29, and with its passage the company abandoned its " Tenth Avenue cowboys " who have been preceding trains along New York's west side streets since 1850. These " cowboys " came into being ninety years ago as the result of a city Ordinance which said " that the Hudson River Railroad Company . . are permitted to propel their cars from Chambers Street to Thirty-first Street, by their locomotive, or Dumb Engines, upon the condition that the same shall not be run at a greater speed than 6 m.p.h. ; and also, that they shall employ a proper person to precede the trains on horseback, to give the necessary warning in a suitable manner of their approach." Movement of trains along this New York street was drastically reduced in 1934 when the new St. John's Park freight terminal, connected with the 33rd street yard by elevated tracks, was opened. Since then three pony riders, each working an eight-hour shift, have limited their activities to between 17th and 30th streets. The New York Central has now completed the removal of all its freight tracks from the surface of Manhattan streets, excepting three short industrial lines immediately adjacent to the 33rd street and 72nd street yards. All other tracks are either above or below street levels.

* * * *

Progress in American Single-Line Signalling

The changing attitude in the U.S.A. to the problem of single line track circuit signalling, produced by the development of C.T.C. control methods and the recently enforced official requirements affecting braking distances and other factors involved in automatic signalling, was referred to in the article on American signalling in our issue of May 15 (page 544). Attempts are now being made, as described in recent issues of our U.S.A. contemporary *Railway Signaling*, to work out methods whereby the principal operating needs of those lines may be met, which are unable to afford—or for other reasons adopt—the more elaborate arrangements now used by others and desire to get some simpler form of long distance control over train movements. These proposals involve using fewer signals than hitherto at loop stations, and multi-position rotary type handles on the dispatcher's board. Hand operation of points is retained. Certain lines, it is understood, have undertaken to give practical trial to these ideas, which are certain to give rise to lively discussion in America.

* * * *

Overloading the Locomotive

It is perhaps inevitable that locomotives should occasionally be overloaded, and it is not always the addition of an extra vehicle or two that is responsible but that the engine is out of condition, steaming badly or otherwise falling short of its rated output, so that the normal load proves too much for time-keeping. Sometimes locomotives designed to meet the requirements of average traffic conditions when they were built, and having a reasonable but not large overload capacity, become outclassed when the attempt is made to retain them at the head of trains that have increased in weight as a more or less regular thing. A remedy is sometimes sought in re-boilering the engines to larger dimensions, with a higher steam pressure and consequently increased rated tractive force. If by this measure they are brought up to a condition which enables them to deal satisfactorily with the bigger loads all will be well. If, however, still more weight is added to the trains, the position again becomes difficult and by that time the fact has been established that another and more powerful type is needed.

* * * *

Locomotive Articulation in U.S.A.

Recent American freight locomotive practice, especially on lines operating over long and steep grades, has seen a distinct trend towards the development of articulated types. This is, in effect, a reversion to type, as the Mallet compound locomotives which introduced articulation to American railways had been largely ousted from the favour of railway operating officers by powerful and more simply designed non-articulated engines of the 4-8-2, 4-8-4, 2-10-2, 2-10-4, and similar wheel arrangements. But latterly demands for even greater locomotive power, coupled with flexibility of wheel-base on curves, have compelled a reconsideration of the advantages offered by articulation. The Denver & Ric

Grande Western RR., operating a very difficult route through the mountains southwestwards from Salt Lake City, Utah, has recently taken delivery of nine 4-6-6-4 4-cylinder simple locomotives for fast freight service over this line to and from Grand Junction, Colorado, to replace the 4-8-2 and 2-10-2 engines previously used. The result has been to increase trainloads by 25·2 per cent., gross ton-miles per locomotive mile by 23·7 per cent., and gross ton-miles per train-hour by 18·4 per cent. On the credit side of the balance sheet, there has been a reduction of 7·0 per cent. in fuel costs, and of 17·2 per cent. in the wages bill; while the provision of pilot or banking assistance over the heaviest grades has been reduced by 15·6 per cent. No operating difficulties arise in the working of the lengthy trains handled by these extremely powerful locomotives, as the train service over many of these Western American main lines is relatively infrequent, and the maximum locomotive power that can be compressed within the loading gauge thus offers attractive possibilities of economy

* * * *

Locomotive Accessibility

The use of the word accessibility in connection with locomotives is here intended to refer to the arrangement of component parts and fittings so that they can easily be got at for inspection and repair. The cost of doing so can be increased considerably if other parts have to be removed in order to reach those requiring attention or if tools have to be operated in awkward positions and inadequate spaces. This may to some extent be unavoidable, but it all takes time and adds to the expense of a repair and consequently has an adverse effect on maintenance accounts. Continental and American locomotive design is sometimes criticised because the neat and clean appearance of British locomotives is sacrificed to a desire to place everything outside where it can be readily got at, but that this object is not always achieved was exemplified by two instances which came under our own observation a few years back on Continental railways. In one of these it was necessary to remove the buffer beam and its appurtenances in order to get the cylinder covers off for cylinder inspection or withdrawal of the pistons, while in another the boiler had to be lifted to give access to the inside cylinder connections. These, however, were apparently isolated cases, the usual trend being to render every part as accessible as possible and leave appearances to look after themselves.

* * * *

Valve Gears for 100 m.p.h.

The provision of a boiler big enough to supply all the steam the cylinders could take under any conditions dates in this country from Ivatt's Atlantics of the " 251 " class, with 18¾ in. by 24 in. cylinders, but until the G.W.R.-L.N.E.R. trials of 1925 there was little thought outside Swindon as to whether the cylinders were capable of using all the steam the boiler could provide. Since that time there has come a balance in locomotive design which has been equalled probably at no earlier stage in railway history. But the equilibrium is by no means static, and changing conditions demand its constant adjustment. Despite increase in speeds, the standard of boiler design has proved no retarding factor, and viewing such maximum speeds as 120-126 m.p.h. attained by at least two locomotive classes, one is tempted to ask whether valve gears as now generally applied can be used when top speeds of, say, 90-110 m.p.h. become common for express trains as a whole. Nor is the question solely one between poppet valve gears and radial types, for however desirable may be the separation of compression and release events from the cut-off conditions, the locomotive is primarily a railway machine, and the improved mechanical or thermal efficiency of one constituent must not adversely affect the traffic-moving capacity. There may be no urgent necessity for a new valve mechanism to suit 100 m.p.h. speeds, but it is possible that such a need may arise in view of the increased steam pressures and temperatures and the higher inertia forces which have accompanied the last few years' movement towards three-figure speeds; and recently poppet valves have shown that their use enables gains in power and economy in steam consumption to be obtained at very high speeds.

The Indian Railways in 1939-40

WE have now received the report of the Railway Board on Indian railways for the year ended March 31, 1940, brief details of which were mentioned in our Indian correspondent's letter in THE RAILWAY GAZETTE of May 2 last. As the prosperity of the country varies mainly with that of its principal industry, agriculture, and as the latter is dependent upon monsoon rainfall, it is noteworthy that the rainfall was within 20 per cent. of the normal throughout the sub-continent with the exception of the Punjab, Sind, Rajputana, Gujarat, and north Hyderabad, where it was defective to an appreciably greater degree. So that, though famine conditions prevailed locally in some areas, the season as a whole may be considered as favourable. This is borne out by the fact that State-owned railways registered an increase in gross traffic earnings of Rs. 317 lakhs (£2,377,500) over the corresponding figure for 1938-39, and enabled a net surplus of Rs. 433 lakhs (£3,247,500) to be credited to the general revenues of the country in part payment of the contribution of Rs. 463 lakhs due from the railways in the year under review. Traffic statistics for all Indian railways are included in the report, even though it is concerned directly or mainly with the finances of the State-owned lines only.

The following are some of the traffic figures for both 1939-40 and 1938-39 by way of comparison :—

	1938-39	1939-40	Percentage difference
Passengers carried (millions)	530·6	529·7	− 0·17
Passenger-miles (millions)	18,743	18,522	− 1·18
Passenger earnings (crores)	Rs. 30·73	Rs. 30·47	− 0·85
Average fare per mile	0·295d.	0·296d.	+ 0·32
Average length of journey (miles) ...	35·3	35·0	− 0·85
Freight carried (million tons)	88·4	92·2	+ 4·30
Net ton-miles (millions)	22,159	23,493	+ 6·02
Freight earnings (crores)	Rs. 68·57	Rs. 72·56	+ 5·82
Average rate per ton-mile	0·561d.	0·524d.	− 0·84
Average distance a ton carried (miles) ...	250·8	254·9	+ 1·63

The tariffs are converted to pence for the benefit of our readers generally so as to facilitate comparison with those of railways elsewhere.

A total of 74 miles of new lines was opened during the year and 49 miles were closed to traffic. The Bengal-Dooars (metre-gauge) Railway, 160·7 miles, was purchased by the State from the company formerly owning and working it, and the Hardwar-Dehra broad-gauge line was also similarly purchased at a cost of Rs. 43,35,000 (£325,125). Further steps were taken during 1939-40 to improve earnings, among them being : the issue of zone-season and also circular-tour tickets (covering distances varying from 3,684 to 4,939 miles) over practically the whole of India ; cheap return tickets ; special rates for fresh-fruit traffic, and cotton seed in wagon loads ; and as from March 1, 1940, increased fares and rates were charged on all lines to the extent of $\frac{1}{16}$ and $\frac{1}{8}$ respectively, the latter, however, not applying to coal. On this commodity the surcharge of 12½ per cent. (with a maximum of Re 1 a ton) was replaced during March by an increase in freight of 15 per cent. without maximum limit. Further efforts were made to counteract the effects of road competition by introducing special reduced fares and rates, and by improvements of services. Rises in costs of petrol, oil, vehicles, and spare parts tended, however, to check further reductions in road transport tariffs. The railways continued their policy of extending through road and rail facilities by opening additional out-agencies.

Meanwhile, various measures were taken to curtail expenditure. To reduce train-mileage as demanded by the outbreak of war, mail and express trains were, in some cases, slowed down and additional stops inserted to enable other trains to be cancelled. A careful scrutiny of services also enabled other unimportant suburban and branch line trains to be deleted from the timetables. On the engineering side permanent way gang lengths were increased on some lines, and an extension of welding of points and crossings provided substantial economy. Various measures were taken to obtain greater availability and increased utilisation of locomotives and rolling stock, and locomotive exchanges were arranged to the mutual benefit of the railways concerned. Job analysis was further extended, and one railway alone, the North Western, effected a saving of over £41,000, bringing the total saved on that system during the seven-year period, 1933-40, to no less

than £926,250, at a cost of job analysis organisation of under £50,000. Examination of statistics with a view to closing unremunerative branch lines was continued and one section was closed during the year. Curtailment of coastal shipping services and increased sea freights began to have their effect upon the railways by causing a considerable volume of traffic to be diverted from sea to rail. Military traffic and the development of indigenous industries, fostered by the war, also improved railway earnings, but overseas tourist traffic practically ceased. Yet, despite the adverse effects on earnings of restrictions on exports to enemy and neutral countries and the dislocation of normal international trade, the year closed with receipts over £2½ million higher than those of 1938-39.

Of the eight new railways, with an aggregate route-mileage of 324, under construction during the year, by far the most important were the broad-gauge Sind Right Bank Feeders line, 84 miles in length, and the Mudkhed-Adilabad 100-mile metre-gauge extension. The North Western Railway is responsible for the former, which runs through the area irrigated by the waters of the Indus, through the agency of the great Lloyd barrage, near Sukkur, and its vast network of canals. This line was 75 per cent. completed on March 31, 1940. The Mudkhed-Adilabad, which was half finished by that date, is an extension of the Nizam's State Railway in Hyderabad, and its construction was undertaken by the administration to develop the mineral, forest, and agricultural resources of the Adilabad district of the Nizam's Dominions. Three short lines with a total length of about 74 miles were opened for traffic during the year, but no new works of any magnitude were undertaken. A number of open-line improvements were, however, carried out, and several important works were sanctioned, including the regirdering of the Dufferin bridge at Benares on the East Indian Railway, estimated to cost Rs. 83 lakhs (£622,500) of which Rs. 25¼ lakhs will be borne by the United Provinces Government on account of the 25-ft. overhead roadway to be provided.

Two of the most famous expresses in India, the Imperial Indian Mail and the Deccan Queen, were withdrawn in October and November, 1939, as war economy measures; on most railways there was a general reduction of train services, but this in no case amounted to more than about 10 per cent. On the other hand, to insure better connections, trains were speeded up on some systems. After running an aggregate distance of 515,000 miles, the 11 diesel railcars on the North Western Railway were withdrawn from service for the "rectification of inherent defects." As an index of goods train operation on Class I railways, the average net ton-mileage per engine-hour rose from 1,854 (1938-39) to 1,901 (1939-40) on the broad-gauge lines, and from 822 to 846 on the metre gauge; net ton-miles a wagon day rose from 351 to 367 and from 147 to 158 on those two gauges respectively. As a war measure the 17 metre-gauge railways in northern India formed a wagon pool as from November 15, 1939. During the year 23 broad-gauge and 22 metre-gauge new locomotives were placed in service. The programme of reducing the percentage of upper class coaching accommodation was continued, together with the improvement of the intermediate and third classes.

Research and development activities included (mechanical) investigations into paint, heated bearings, and wagon door leakage problems, also corrosion tests and oscillation trials of Pacific locomotives were carried out. On the civil side, stresses in track, heat treatment of crossings and fishplates, various types of rail expansion joints, staggered rail joints, spring crossings, and welded rail joints were investigated; experiments were also made (*a*) with metal sprayed and cement-wash coated bridge girder plates to combat corrosion, and (*b*) with the "limit" spanner for the prevention of creep by insuring uniformity in tightness of fishbolts. In accidents to trains, rolling stock, and permanent way, 44 (66) passengers and 13 (17) railway servants were killed, and 134 (272) passengers and 93 (152) employees were injured, the numbers in brackets being those for 1938-39. As the number of passengers carried was 560,000,000, there were only 0·08 killed and 0·23 injured per million carried. The report includes the usual series of excellent photographic illustrations, and may be said to present an up-to-date review of Indian railway progress.

Sir William Wood's Appointment

THE decision of the Directors of the London Midland & Scottish Railway Company to appoint Sir William Wood President of the Executive of that company had been fully expected, but it is none the less welcome. Sir William was in the very closest contact with the late Lord Stamp during his ten years in the joint offices of Chairman of the Board and President of the Executive, and together they formed a good executive combination, for in many respects Lord Stamp and Sir William Wood were complementary in character. Sir Thomas Royden was recently appointed Chairman of the L.M.S.R., and now that Sir William Wood has succeeded him in the Presidency, the company is reverting to its original practice of filling the two positions by separate individuals. Sir William Wood has been Vice-President of the L.M.S.R. since the beginning of 1930 and is uniquely qualified, both by reason of his personal attributes and by his long and close association with his predecessor, to fill the gap caused by the death of Lord Stamp. In the present complex situation, both financial and operational, of the railways the L.M.S.R. is fortunate in having an officer not only of such forceful and creative abilities, but also with so intimate a grasp of the numerous problems which face the railway industry.

* * * *

Mr. Collett's Retirement

THE retirement of Mr. C. B. Collett from the position of Chief Mechanical Engineer of the Great Western Railway, which he has held for over twenty years, is an event which will naturally arouse interest in locomotive circles, as usual when the post of a railway chief officer is vacated and another well-known name ceases to be actively associated with his company. Mr. Collett's long *régime* began at a time when individuality in locomotive classes was perhaps at its height, and finishes with what may almost be described as the apotheosis of standardisation. Churchward had inaugurated the era of the modern steam locomotive, with its efficient system of steam distribution to the cylinders and the free exhaust, features which did more than anything else to perpetuate the steam locomotive as the prime favourite for motive power on railways in a period which has seen the steady development of rivals in the form of electric and internal-combustion traction. During this time Collett was closely associated with Churchward and when he became Chief Mechanical Engineer he perpetuated Churchward's epoch-making feature and adapted it to all the locomotives built during his term of office. Having recognised as an inheritance this important development, upon which no essential improvement has since been made, he proceeded to equip the Great Western Railway with large numbers of a few classes of standard locomotives suitable for the requirements of the Traffic Department. No other British railway except the L.M.S.R., the Locomotive Department of which has an intimate link with Swindon, has achieved anything like the same degree of standardisation, in which the ideal of the Traffic Department to have locomotives which can be used with almost equally good results for any purpose has been so nearly achieved.

Mr. Collett is one of the few Chief Mechanical Engineers who received his early training in a different branch of engineering; but in 1893, as a young man, he entered the service of the Great Western in the Mechanical Engineer's Department and rose to be Chief at Swindon 29 years later. His views on locomotive design and the conduct of the Chief Mechanical Engineer's Department may be described as soundly progressive rather than revolutionary. While not failing to profit by experience gained elsewhere, he aimed at maintaining efficiency in the Locomotive Department by means which avoided anything tending unduly to increase costs. In this he was notably successful, as has been shown by figures quoted on various occasions at the company's shareholders' meetings held at Paddington. Some of the best locomotive work in this country is being done by Swindon-built engines, and Mr. Collett's contribution to the maintenance of the Great Western Railway's fine record in this connection will be acknowledged by all who are competent to judge.

PUBLICATIONS RECEIVED

Cleaning Water Mains.—The scraping of water pipes is a matter of special importance where the delivery capacity of mains is insufficient to meet increased requirements, as often happens under present conditions. The expense and delay entailed in providing additional pipelines can often be avoided by restoring the capacity of existing furred pipes. Glenfield & Kennedy Limited of Kilmarnock has issued a brochure on the subject of cleaning water mains, which mentions that so long ago as 1873 the Glenfield Company had already manufactured and successfully used a pipe cleaning apparatus from which the present apparatus has been developed. Wherever possible pipe scraping is done by pressure scrapers, which can be used for horizontal mains of 4 in. dia. and over. The Glenfield pressure scraper is illustrated in the brochure, and consists of a double articulated scraping head provided with accurately shaped spring steel blades which traverse the whole of the interior surface as the machine passes through the pipes. The scraper is propelled by water pressure on two pistons arranged in tandem and connected by universal joints. Steel blades on the scraping head cut the incrustration from the pipes and remove any surplus lead from badly run joints. Once a scraper has been inserted in a main, its passage is followed by the use of stethoscopes on the ground surface, and should it encounter some unexpected obstruction and stop, it can be quickly located and taken out so that the obstruction may be removed, when the work can be restarted. The speed at which a scraper will pass through a pipeline depends upon various conditions, and is regulated by an upstream sluice valve, usually set to give a speed of about 4 m.p.h. Pipes smaller than 4 in. dia. can be cleared by a hand-worked scraper.

THE SCRAP HEAP

The Chancellor of the Exchequer intends to give up the present passenger tax on railroads, and substitute a tax on the gross annual receipts on passengers at the rate of 5 per cent.—*From "The Glasgow Herald" of* 100 *years ago.*

* * *

The late Mr. William E. Dodd, U.S.A. Ambassador in Berlin, 1933-1938, made the following entry in his recently-published diary, under date August 18, 1934 :—

"Mr. John Garrett, of the B. & O. Railroad family in Baltimore, a former Ambassador to Rome, called to pay his respects and to talk a little about Europe. . . We closed our conversation by my raising the interesting point about his grandfather's contribution to the saving of the American union of states by the building of the B. & O. railroad to Chicago just before 1860 and the management of the road against Virginia and the South. . . ."

* * *

From 1867 to 1871 it was possible to travel all the way from New York to St. Louis over railways with a gauge of 6 ft.—the broadest that ever existed on the North American Continent. The "Great Broad Gauge Route" was as follows : New York & Erie Railway (now the Erie) from New York to Salamanca, New York ; Atlantic & Great Western Railway (now the Erie) from Salamanca to Dayton, Ohio ; Cincinnati, Hamilton & Dayton Railroad (now the Baltimore & Ohio) from Dayton to Cincinnati ; Ohio & Mississippi Railroad (now the Baltimore & Ohio) from Cincinnati to St. Louis. The gauge of the Albany & Susquehanna Railroad (now the Delaware & Hudson) from Albany to Binghamton, New York, and the several lines of the Delaware, Lackawanna & Western Railroad was originally 6 ft.

* * *

The award of prizes for the best essay describing an excursion is a common enough practice with school outings, but this principle was also adopted for a number of years in succession by Mr. T. G. Hobbs, a straw-goods-manufacturers' materials merchant, who organised numerous public excursions from Luton and district in the latter part of last century. Some of these prize-winning efforts on the part of delighted excursionists were reprinted in pamphlet form, and the following extracts are taken from the Prize Essay written by Miss C. R. Plowman, of Lower Gravenhurst, near Ampthill, Beds, about "Hobbs's Fifth Annual Excursion" to the West of England, July 8, 1885 :—

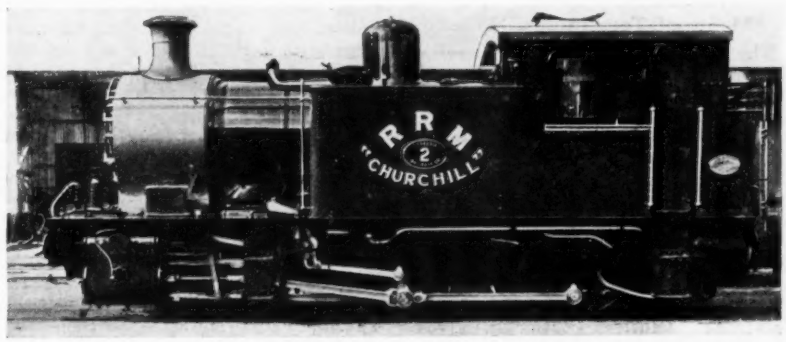
"Many weeks, I may say months, before 'Hobbs's Fifth Annual Excursion' was announced, it was looked forward to with the greatest pleasure . . . At last the eventful and long-wished-for 8th of July came, and a quarter to three in the morning" (!) "finds us at the Great Northern Railway station, Luton, a lively and bustling throng. The excursionists from all stations meet at Bletchley, and after passing the little stations of Swanbourne and Winslow, we come to the historical and scholastic town of Oxford. To those who are not paying their court to Morpheus, how many historical scenes crowd into their minds ? . . . but we must not pause to mention the many events of history connected with this ancient town. Passing Didcot station, we wind [*sic*] through the Vale of the White Horse. . . . Now we are at Swindon, where we notice the large carriage works of the Great Western Railway Company, thence passing on through gentle rising hills and pasture land, still thinking of the good and wise King Alfred, whose history is so intimately connected with this district, we come to Chippenham, where for some years he held his court."

Arriving later at Bristol, Miss Plowman and her fellow passengers walked through the busy streets of Bristol to Brunel's suspension bridge, "the chasm spanned by which is very romantic." They then took train again, presumably from Clifton Bridge station, to Portishead, "where the *Lady Margaret* lies, neat and trim, waiting to carry her human burden over the dancing wave."

* * *

"CHURCHILL"

A Rhodesia Railways workshop shunting engine has been named *Churchill* as a tribute to Great Britain's wartime Prime Minister. This locomotive was built by Hudswell Clarke Co. Ltd. in 1929 for shunting operations at the Port of Beira, but was later withdrawn from service. It has now been allocated as workshop shunting engine at the Umtali mechanical workshops of the Rhodesia Railways. The engine is painted green, with yellow and black lining and red buffer beams. All other Rhodesian locomotives are painted black and (with the exception of *Jack Tar*, the Bulawayo workshops shunter) *Churchill* is the only named engine.



Rhodesia Railways workshop shunting engine No. 2 "*Churchill*"

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

INDIA

Temporary Reprieve for Another Branch Line

Among the railways scheduled for dismantling in order that their permanent way and other equipment may be made available for war purposes, is the Hyderabad — Badin branch of the North Western Railway in Sind. As, however, commercial bodies in that province have protested vigorously against this action, the Government of India has agreed to defer it, pending consideration of these representations. This branch was taken up during the last war and subsequently relaid and reopened for traffic.

Communal Ratios on State Railways

Mr. F. De Souza's report on the working of communal ratios on State Railways has been circulated to all the railways and to the Railwaymen's Federation for opinion. The Government's decision on his fundamental recommendations will be made only after the replies from the railway administrations and other bodies have been received and examined by the Railway Board. Meanwhile, it is understood that action on some of the minor recommendations of the report has already been taken.

45 Lorries Run into Level Crossing Gates on N.W.R. in 1940

During the year 1940 there were 45 accidents occasioned by lorries running into level-crossing gates on the North Western Railway, causing damage to the extent of about Rs. 10,000 (£750).

G.I.P.R. Workshops Stay-in Strike

Some 3,000 employees in the Matunga (Bombay) workshops of the Great Indian Peninsula Railway staged a stay-in strike on January 15, because they had not received any allowance to compensate them for the rise in the cost of living.

CANADA

Montreal Terminal, C.N.R.

The total outlay under the Canadian National Railways terminal construction programme at Montreal was $22,425,012 to December 31, 1940, according to a report tabled in the House of Commons by Hon. P. J. A. Cardin, Minister of Transport. It also stated that expenditures in 1939 and 1940 were $2,174,590 and $3,599,075, respectively, chargeable to railway account, and the estimated outlay for 1941 was $4,100,000. The $4,100,000 would be spent in 1941 on completing sub-track facilities, platforms, track layout, the East Street bridge, roads, parking areas, and the continuation of construction of station and auxiliary services. The viaduct, elevated railway, grade separation and layout between the station area and Victoria Bridge would be completed. Railway connections and a coach yard at Point St. Charles were also provided for. A passage in the report reads : " The 1941 programme provides for the continuation of the project with the expectation that portions of the facilities may be used for operation in connection with war traffic before the end of the year, and the project completed early in 1942, thereby releasing various facilities between Turcot and Bonaventure Streets for much-needed freight services."

The St. Lawrence Waterways Project

At the recent annual meeting in Toronto of the Ship-by-Rail Association of Ontario, a motion was passed, stating that " while the association was interested in the progress of our Dominion and the successful prosecution of the war effort, the St. Lawrence Waterways project could not be considered as being in this category." The delegates " felt the war would be over before the project could be brought to maturity, and the money to be spent on this work could be utilised to a much better advantage for our immediate needs, and that the present transportation systems could adequately handle all traffic offered and had never really been called upon to do their utmost. Further, it would be only a seasonal form of transportation and, as such, it might possibly be more harmful than helpful. There was no objection to the power feature of the scheme."

SOUTH AFRICA

New Works and Works in Progress

Although because of the war the new works programme has been modified, a large sum has been allocated in respect of the projects in hand and those to be undertaken shortly. The following is a synopsis of the more important works in hand, showing in each case the progress made :—

Deep-water Berths and Reclamation, Cape Town (£3,696,703).—The quay wall of four additional berths has been completed for 2,343 ft., and 9,400,000 cu. yd. of spoil have been deposited in the area to be reclaimed. Demolition of the old random block mole is finished, and the new eastern mole, the length of which is 6,825 ft., is nearly complete.

Enclosed Harbour Scheme and Reclamation, Port Elizabeth (£2,370,773).—Practically all the work in connection with the enclosed harbour scheme has now been carried out, and satisfactory progress is being made with the reclamation of a large portion of the foreshore for railway expansion and other purposes.

Deep-water Berths, Durban (£2,212,384).—The first two additional deep-water berths, providing a berthage of 1,220 ft., are now in use, and 26 caissons are in position for the new T jetty. Over 5,600,000 cu. yd. of rubble and spoil have been handled in connection with the provision of the additional berthage, and the whole work is now about half finished.

Cape Eastern Main Line Deviations and Improvements (£2,000,000).—This project embraces regrading and deviation of the main line between East London and Springfontein, to allow of increased speeds. The length will be reduced considerably and already several new deviations, bridges, and tunnels are open to traffic.

New Freight Facilities and Marshalling Yard, Pretoria (£1,028,263).—Considerable progress has been made with these extensive works, the principal features of which are the provision of a new goods depot at Potgieter Street, Pretoria ; the remodelling of the Pretoria West yard ; and provision of a new locomotive depot amd marshalling yard at Capital Park.

Turning Basin, Mailboat Quay, Sheds, etc., East London (£736,020).—These works, which are nearing completion, include the construction of a turning basin and wharf sheds, the extension of the C. W. Malan quay wall, and the construction of a new Eastern pier and removal of the old training wall.

Yard Alterations, Germiston (£694,541).—The improvements include new buildings, additional tracks, extensions to existing platforms, and improved traffic handling facilities. Owing to the heavy traffic the scheme is divided into several stages, the first of which was opened recently.

New Goods and Marshalling Yard, Prospect Township, Johannesburg (£693,994).—The work of establishing a new marshalling yard on the site of the old Prospect Township at Johannesburg is proceeding steadily. Heavy earthworks are involved, and some 1,300,000 cu. yd. have been excavated or deposited. A commencement has also been made with the construction of the new goods sheds, which will be 960 ft. long and 320 ft. wide.

SWEDEN

Increased Profits of Private Railways

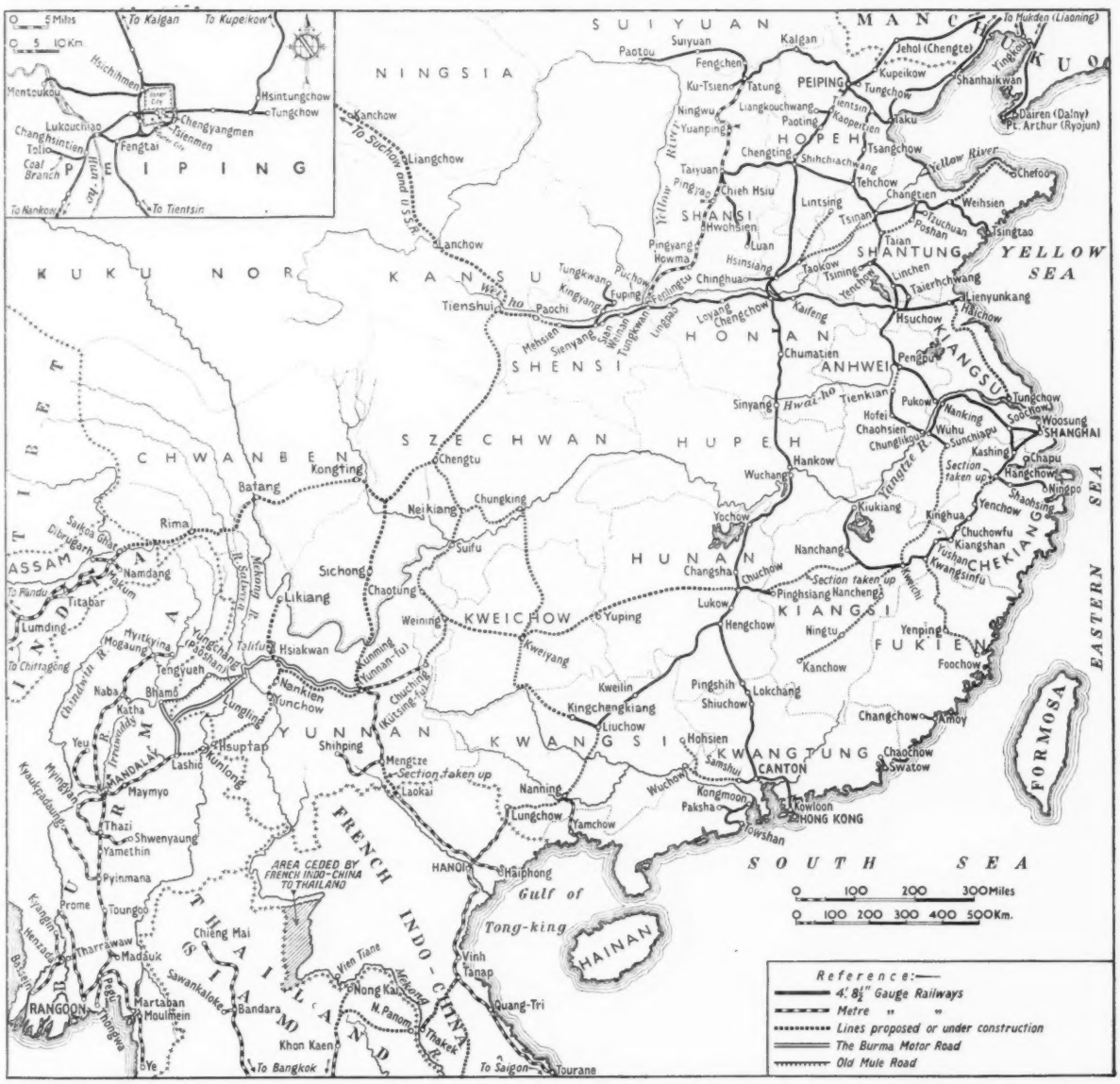
The revenues of the private railways collectively amounted to Kr. 151,500,000 (£8,912,000) during 1940 as against Kr. 128,000,000 in 1939, and expenditure increased from Kr. 95,000,000 to Kr.113,000,000 (£6,680,000), according to a summary report, just published. After allocations for renewal funds, interest and taxes, there remains a net surplus of Kr. 16,400,000 (£965,000) or over Kr. 2,000,000 more than for 1939. The increased yield is due primarily to the reduction of road motor traffic in Sweden, caused by the scarcity of liquid fuel, and to shipping difficulties, as well as to the very heavy demand for wood fuel to supply cities and communities, in place of coal and coke, of which it has not been possible to import sufficient quantities.

THE BURMA—CHINA RAILWAY

The British Government's decision of April 1 to link the Burma and China railway systems makes it possible to contemplate the completion of this important through route

ON April 1 the Secretary of State for Burma announced in Parliament that the Government had decided to finance the construction of the Lashio—Kunlong extension of the Burma Railways, to link the latter with the Chinese railway system, as recorded on page 407 in our issue of April 4. Continuity of a great international trunk line about 1,650 miles in length, connecting Rangoon with Chungking, is thus assured, as the initial 567 miles from Rangoon to Mandalay and thence to Lashio has been in operation since 1903, and the Chinese Government is busy building much of the 1,000-mile length in China, and is anxious to complete it as early as possible. The 100-mile section east of Kunming, capital of the Province of Yunnan, has recently been opened, and earthwork upon several other sections is reported to have been finished, and more is in hand, as also is masonry bridgework.

The Burma—Yunnan railway project, now nearly half a century old, is therefore to materialise at long last, and it is significant that the Northern Shan States branch of the Burma Railways was to have gone through to Kunlong at the beginning of the century, but, for political reasons, work was stopped short at Lashio. Most of the 100-mile section thence



Map showing the Burma and China railway systems and the approximate alignment (shown dotted) of the connecting line from Lashio via Kunlong to Kunming and connections beyond with Chungking and Chuchow

to the frontier—at Hsuptap, about 15 miles east of the Kunlong ferry over the River Salween—was therefore surveyed in detail.

Turning now to the whole railway as it will be, the first point to note is that it will be based on a fine modern port, Rangoon, where the largest vessels going East can berth at jetties provided with ample warehousing and transit sheds, sidings and handling appliances. Traffic thence is dealt with at either a spacious marshalling yard, Malagon, that has handled 34,000 wagons in a month, or at the main passenger station, which leaves little to be desired, so it will be seen that terminal facilities are excellent.

The 386-mile main line onwards to Mandalay is exceptionally well equipped and of high standard for metre gauge, the first 170 odd miles being double line. Indian standard "YC" and "YD" 4-6-2 and 2-8-2 type locomotives, with 19,700- and 22,100-lb. tractive effort, work the principal express passenger and goods trains respectively, and are supplemented by large classes of 4-6-0 passenger and mixed traffic engines. The ruling gradient is 1 in 200 and curves, which are easy, have recently been modernised for high-speed running. As far as Mandalay, therefore, additional through traffic to and from China can be handled efficiently and expeditiously, probably without further capital outlay.

The Capacity of the Lashio Branch

Though the 181-mile Lashio branch presents a completely different picture, it also is capable of dealing with heavy traffic, and the extra trans-frontier volume that may be expected should not tax its capacity severely. Additional locomotives may be required, and possibly a few more crossing loops, but the outlay should not be heavy. This branch has exceptionally steep gradients. The climb from the plains near Mandalay to the Shan plateau necessitates nearly 13 miles continuously inclined at 1 in 25, except for short lengths of level in stations and for easing the brakes of descending trains. Over about 150 miles of the remaining length the ruling grade is 1 in 40. Curves are as sharp as 17-deg. (5-ch. radius) and reverse curves follow one another in quick succession on some parts of the branch.

All-articulated Locomotive Power

Nevertheless, powerful 2-8-0 + 0-8-2 Beyer-Garratt locomotives, weighing over 100 tons and developing 41,900-lb. tractive effort, make light of 180- to 210-ton loads on the 1 in 25 section, and double that tonnage on the 1 in 40 grades. Also, an older but still efficient North British-built 0-6-0 + 0-6-0 Mallet compound type—comprising a fairly numerous class—is capable of hauling about 240-ton loads on the 1 in 40 grades and 120 tons on the 1 in 25 section; the tractive effort is 29,400 lb. All vehicles, passenger and goods, are fully vacuum braked. The branch is, therefore, well equipped, and already carries an appreciable mineral traffic in connection with the Burma Corporation mine, which it feeds with iron ore as a flux for silver-lead smelting. On this branch is the famous Gokteik viaduct, spanning a deep gorge 2,200 ft. wide, the highest trestle (320 ft.) of which is founded on the portal of a natural rock tunnel. The bed of the river flowing through this tunnel is no less than 870 ft. almost vertically below rail level on the viaduct.

Lashio—Kunlong Section

Actually, there are two possible routes for the railway extension from Lashio to near Kunlong, (*a*) the one surveyed in detail prior to 1900, and (*b*) a less-promising alternative *via* Hsenwi, the Nam Tu, and Nam Nim valleys. Although (*b*) avoids the Salween gorge, has better local traffic prospects, and is about the same length as (*a*), it has considerably more rise and fall—mitigating against economical operation—though both alignments cross the Irrawaddy—Salween watershed at an altitude of about 2,900 ft. At any rate route (*a*) was recommended by the survey engineers, in preference to (*b*).

Alignment Surveyed in 1893-1900

Through the courtesy of Mr. George Richards,* who was in charge of the survey parties working along the Salween river in 1899-1900, these details and the reproduction of one of the photographs he then took are available.

From Lashio the line located ran eastwards, at first through open and fairly easy country with a rising tendency, to cross the Irrawaddy—Salween watershed, near Mong Yaw, about 34 miles from the present railhead. As Lashio station is 2,550 ft. above sea level, there is a rise of only about 350 ft. in these 34 miles.

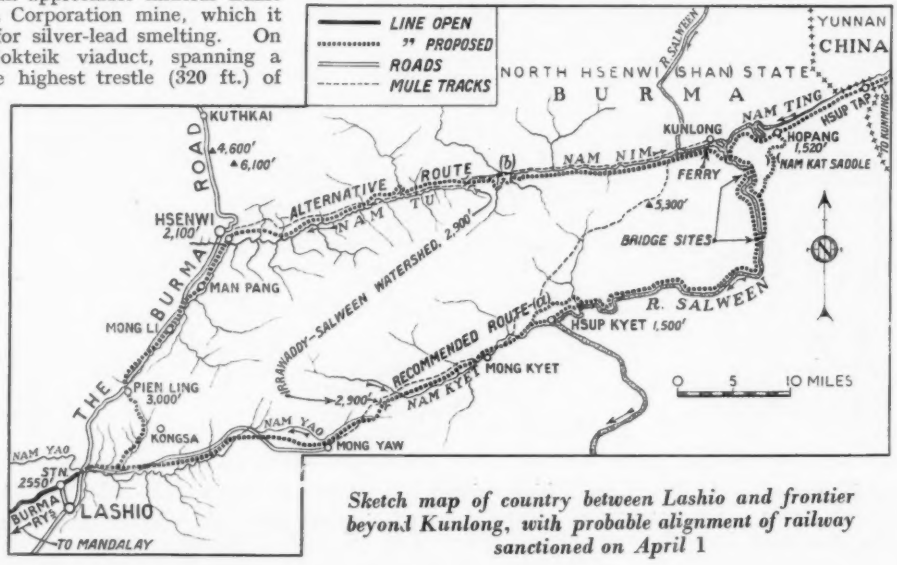
From the watershed, the line follows the Nam Kyet stream down to Hsup Kyet (mile 55¾), its confluence with the River Salween, at approximately 1,500 ft. altitude; the fall thus averages about 1 in 90, but the ruling gradient is 1 in 40 or 50 compensated for curvature, and the sharpest curves are likely to be 10-deg. (about 9-ch. radius).

In the neighbourhood of Hsup Kyet the alignment must strike into the Salween gorge and follow it more or less closely to the Nam Ting valley, a distance of about 40 miles. To quote Mr. Richards: "Most of this length is comparable, on a bigger scale, with the gorges of the Avon at Bristol and the Wye above Chepstow." To avoid a particularly difficult length two or three miles above Hsup Kyet, it is possible that, in the final location survey, that place may be by-passed, and that the line will keep up the hillsides. Otherwise, the gorge length can be negotiated by a generally level line intermittently adhering to the 1,500-ft. contour up either bank of the river. The right bank can best be followed for 13 miles above Hsup Kyet as the left bank abounds in cliffs and bluffs, but beyond that point, there is less to choose between the difficulties on right or left bank.

The Salween Bridge

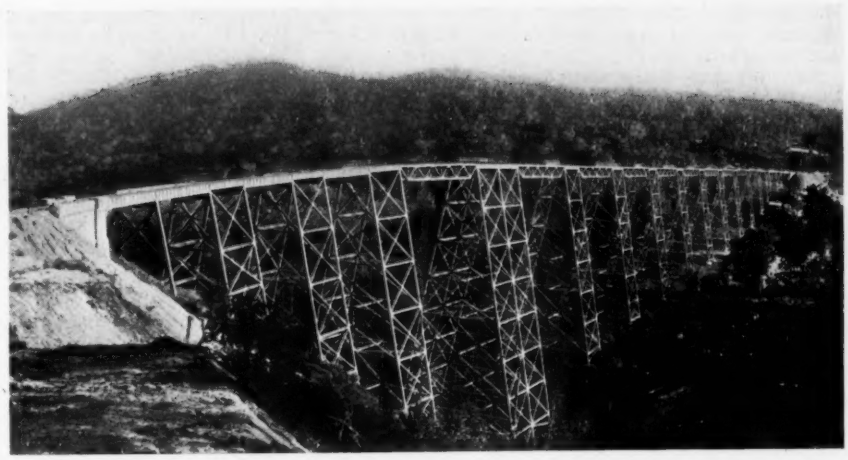
As the line has to run up the south side of the Nam Ting valley beyond Kunlong, it follows that the Salween must be crossed below the confluence of the Nam Ting with that river. There are several good bridge sites, notably one 3 and another about 13 miles below Kunlong. It should here be noted that though the Salween is confined between rocky banks and is therefore narrow for so great a river, it is believed to have a rise of nearly 100 ft. between low water and high flood levels. So that, although the river is less than 200 ft. wide at low water at the lower and more favourable of these bridge sites, and may be bridged with a single main span of 200 or 250 ft. together with land spans aggre-

* Mr. Richards subsequently became Chief Engineer to the Indian Railway Board, and officiated as Member of the Railway Board



Sketch map of country between Lashio and frontier beyond Kunlong, with probable alignment of railway sanctioned on April 1

gating about 350 ft. in length, even this bridge would be costly on account of its height. If this site is chosen for the bridge, the line may either continue along the left side of the gorge thence to the Nam Ting confluence, or strike across country over the Nam Kat ridge—requiring a tunnel about 200 yd. long—to drop into the Nam Ting valley near Hopang. The bridge site 3 miles below Kunlong has the advantage of a rock in mid-stream, and other considerations may cause the line to keep to the right bank of the Salween to that point, which is near the Nam Ting confluence. Once in the Nam Ting valley a nearly level and easy line is obtainable to the frontier at Hsuptap, where the British contribution to the through railway ends.



The Gokteik viaduct from the north. Note the fifth trestle, 320 ft. high. The river is 870 ft. below rail level, just to the right of this trestle

The magnitude of the task facing the Chinese engineers in the construction of the 1,000-mile length of new railway on their side of the frontier is probably comparable with no other line in the world, except, perhaps, the Trans-Iranian Railway, so long is the aggregate length of very difficult country traversed. At the moment, the exact route is unknown in this country, but it is unlikely to differ appreciably from that reconnoitred (and recommended) by Major H. R. Davies and the late Capt. W. A. Watts-Jones, R.E., on behalf of the Yunnan Company at the end of the last century.

The first 100 miles of the alignment beyond the frontier fixes itself, as it must follow the Namting, a tributary of the Salween, which is conveniently straight and leads in the exact direction required, precisely to an abnormally low (5,600-ft.) pass in the great Salween—Mekong watershed; this pass is, therefore, an obligatory point for any line of railway following this general route. Due to its low altitude (1,500-2,500 ft.) the first 50 miles of the ascent up the Nam Ting valley are notoriously unhealthy, but the valley bed then rises increasingly rapidly, through more and more difficult country. Beyond the watershed the next 100 miles are probably the most difficult on the whole railway, and include the negotiation of the fearsome Mekong gorge, a very steeply-graded rise—possibly with 1 in 25 grades and considerable artificial development of length—thence to the Mekong-Red River watershed (6,500 ft.) and another switchback into and out of the Red River basin via Nankien.

From, near Hsiakwan, the trade mart of Western Yunnan, the Burma Road is bound to be followed closely all the way to Kunming, the capital of the province. Actually, Hsiakwan, Tali-fu, and Li-change may some day be served by a branch line. The highest point on the railway is likely to be about 8,000 ft., some 70 miles east of Hsiakwan and, though the country is somewhat easier, there are very difficult sections here also—probably necessitating further 1 in 25 grades—and more before Kunming is reached. It is believed that the majority of the earthwork and masonry of the bridges has been completed between Hsiakwan and Kunming, and that much progress west of Hsiakwan has also been made. But lack of rails and bridge girders precludes completion of any section west of Kunming at present. The 100 miles east of that city are, however, already open for traffic, to Chuching. From that point the line will bear northwards through comparatively easy country to Weining in Kweichow Province. This will probably be the junction where the lines from Kunming (*a*) to Suifu and Chungking, and (*b*) to Kweiyang, will bifurcate; (*a*) will eventually connect up northwards with Chengtu, Sian and North China and also with Lanchow, Sinkiang, and the Russian Turk-Sib

A typical reach of the Salween gorge (above the "S" in Hsup Kyet on the sketch map) showing the nature of the country, looking south-westwards, downstream. The line here will either cut through or run over the shoulder of the nose protruding from the right

Railway; (*b*) will lead eastwards to Chuchow, on the Canton-Hankow Railway, and onwards to Nanchang, Hangchow, and Shanghai.

The Weining—Suifu section will probably pass through Chaotung, Ta Kuan Ting, and the Heng Chiang valley, the country becoming very difficult once more. Here an alternative route to the east might be followed in preference to the alignment recommended by Major Davies.

At Suifu the Yangtze is reached and will have to be bridged or a train ferry provided to allow of connection with the Chengtu—Chungking line, now under construction, and over part of this trains from Kunming will run into Chungking.

The gauge of the line from Lashio to Kunming will, it is understood, be metre—the gauge adopted for the Kunming—Chuching section—in keeping with both the Burma and Kunming—Indo-China Railways, but there is as yet no information available here as to the probable gauge north or east of Weining.

From these brief notes it will be clear that the joint actions of the British and Chinese Governments have made possible the construction of a world-famous trunk line destined to prove invaluable to the Allies during the war, and in developing the known mineral resources of Yunnan, in opening up that province, and in giving through communication between Western China and the West after peace is resumed.

FLAME CUTTING OF METALS

Some notes on recent developments whereby it is possible to work to tolerances of 10 to 15 thousandths of an inch, and details of how former difficulties have been overcome

A DETAIL of workshop practice which has made considerable progress during recent years is the flame-cutting of metals by means of oxy-acetylene jets. In the earliest applications of this process single jets were used, manipulated by hand, but the present trend is mainly in the direction of flame-cutting machines, with the travel of the jets guided by jigs, so that cuts of extreme precision are obtained. In carrying out repetition work, not only are stacks of thin plates dealt with by a single jet, but a series of jets, controlled by one jig, can perform independent operations side by side, with the result that the production of a single flame-cutting machine is further multiplied. Such is the smoothness and accuracy of finish now obtained with mechanically-controlled flame-cutting that many of the parts so cut require no further finishing with tools. Various types of both stationary and portable flame-cutting machines are available. The success of cutting through stacks of plates depends on their first being cleaned of dirt, mill scale, paint, or rust, so that the closest contact between plate and plate may be ensured, and then on the application of sufficient pressure by clamps to hold the plates rigidly together. Where the cut is carried close to the edges of the plates, it may be necessary to run a number of welded beads across the edges of the plates instead of using clamps; and it is sometimes desirable to use a "waster" plate of scrap metal on the top of the stack, especially when the cut doubles back across itself, and tends to cause overheating of the metal at the point of crossing. With machine directed jets it has now become possible to cut with such accuracy as to keep within tolerances of 10 to 15 thousandths of an inch. The January issue of our American contemporary, the *Railway Mechanical Engineer*, in summarising a paper on the subject presented to the recent annual meeting of the Master Boiler Makers' Association in Chicago, gives an illustration of bottom pipe collars being flame-cut simultaneously from ten ¼ in. steel plates, an irregular-shaped outside cut 91 in. long taking 15½ min., and a 33½ in. inside cut requiring only 5½ min.

Among special applications of flame-cutting is the piercing of holes through plates or castings—a development of the oxygen lance which has been used hitherto for carrying deep holes through castings and billets. Machine flame-cutting can be used to cut straight-sided holes so accurate in position and contour that no further finishing is needed. Another application is flame-gouging, by which grooves can be formed in the surface of steel plates or forgings. This process requires a cutting nozzle designed to deliver a relatively large jet of oxygen at low velocity, and by the use of different nozzles and methods of manipulation, the depth and width of the groove can be varied over a wide range. By means of spot gouging, with the nozzle so held that the inner cones of the preheat flames are close to the plate surface during the operation, shallow or deep circular depressions can be cut in a metal surface. A further application is that of flame-machining, which is the preparation of plate edges for caulking or welding; bevelled plate edges can be obtained by holding the tip of the jet at an angle, or using a specially designed angular jet. Flame-cutting is also used for the removing of temporary welds, cutting defects out of welded seams, and kindred operations, and for removing rivets; for the operation last-mentioned special cutting tips are required with oxygen orifices of the expanding low-pressure low-velocity type, together with high-intensity preheating flames which cause rapid surface oxidation of the rivet heads. Flame-cutting of staybolts is being developed in similar fashion.

An objection sometimes raised to flame-cutting is that the metal immediately adjacent to the flame-cut edge is injuriously affected by the localised heat treatment that it has received. The effect of applying the jet is that the steel adjoining the cut is heated considerably above the critical range of temperature for the material, and is then rapidly cooled through this range because of the conductivity of the adjacent metal, and if pre-heating has not taken place, this rapid cooling will have the result of quenching the steel. The change in the steel is physical rather than chemical, but in certain conditions it may be harmful. With a mild or low-carbon steel the structure adjacent to the cut is likely to change from pearlite to sorbite, and as the sorbitic structure represents the maximum combination of hardness and toughness in steel, the effect, so far from being disadvantageous, may be beneficial. But with higher carbon steels troostite or martensite may be formed, and this type of structure is less welcome, especially as it is accompanied by a considerable growth in grain size at the cut edge. However, the trouble can be overcome by a general pre-heating of the area about to be flame-cut, or by a suitable post-heating treatment. The considerations last-mentioned apply also to most alloys of high hardness, though the so-called low-alloy steels behave in much the same fashion as a straight low-carbon steel. Investigations have been made into the effect of flame-cutting on nickel-alloy steel of the ordinary 2 per cent. type, which is extensively used in the United States for locomotive boiler construction, but it has been found that the depth of the altered structure rarely extends to more than ·05-in. below the cut edge, and that this band of hardened metal is usually sorbitic. Provided the carbon content of the steel does not exceed 0·35 per cent., flame-cut edges of plates that are to be welded are found to improve the condition of the deposited metal so far as concerns porosity and slag inclusions, with the result that various American authorities have removed all restrictions on the welding of plates which have been prepared in this way, provided the carbon limit just mentioned is duly observed. This is in accordance with the experience in Great Britain of building up the worn noses of rail crossings with weld metal, for there is proof that rails which have been subjected to the sorbitic treatment make a more satisfactory base for the deposit than untreated rails.

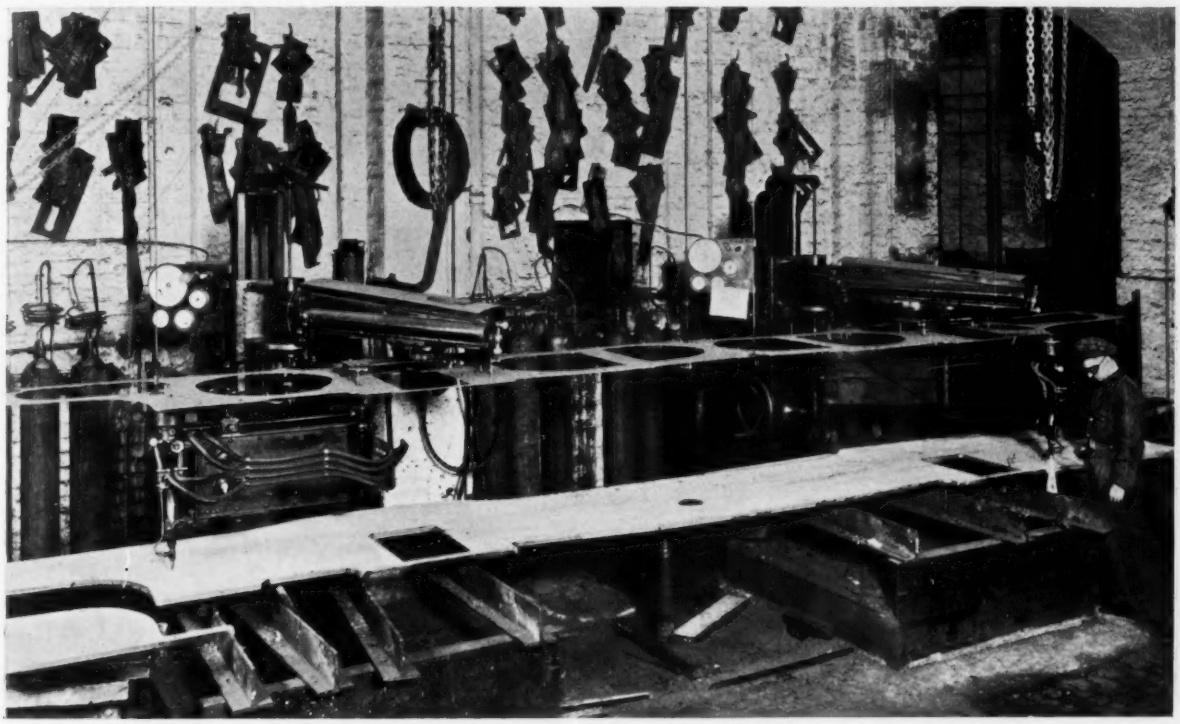
CUTTING OF LOCOMOTIVE FRAME PLATES

Gas cutting machines at Doncaster works, L.N.E.R., are used for a variety of purposes in addition to frame cutting

THE photograph reproduced herewith* shows two of the British Oxygen Company's universal oxygen cutting machines mounted side by side and in operation upon a locomotive frame in the Doncaster works of the London & North Eastern Railway. Using coal gas mixed with acetylene, together with oxygen, these machines produce a large number of engine, tender and carriage components, varying from small pieces weighing a few ounces to parts such as electric locomotive and Pacific type steam locomotive bogie frames and piston crossheads.

The machine consists of a fabricated steel base, shaped to provide a receptacle for the oxide formed during cutting, on which rolled steel tees are rested, with sliding job rests to give a firm support to the work and raise it clear of the base. At the rear of the base is a cast-iron column (in some of the latest designs it is fabricated) with vertical machined slides on the front face. Sliding on these, and counterbalanced by a weight at the rear of the column, the template arm, carrying a sliding saddle beneath which a sheet steel template can be supported, is located above a folding gate arm, hinged in two places with roller bearings. The two arms can be raised or lowered simultaneously by the handwheel seen on the right hand machine, and the distance between them is also adjustable. The folding gate arm carries at its free end a cutting blowpipe mounted in slides and raised and lowered by a rack and pinion, together with controls for turning the heating and cutting gases on and off, and for starting and stopping the electric motor. On the top of the gate arm, mounted co-axially with the blowpipe, is a vertical magnetic roller with its energising coil, this being driven by shafting and variable speed gearing from an electric motor mounted in the lower part of the column. Regulators for the gases are mounted on the left-hand side of the column, and the gas pressures and speed of cutting are indicated on the instrument plate above.

In operation a steel template cut from sheet about $\frac{1}{8}$ in. thick is mounted on the template holder and positioned over the work. The magnetic roller will then grip the edge of the template and run round at a predetermined speed, so that the cutting blowpipe below traces out exactly the same pattern. The procedure for oxygen cutting is already well known; it may, however, be stated that the 55 in. universal machine possesses controls on the blowpipe allowing both heating gases to be adjusted independently and then turned on and off simultaneously, and the cutting oxygen to be turned full off and on by a single turn, the two handwheels being mounted concentrically.

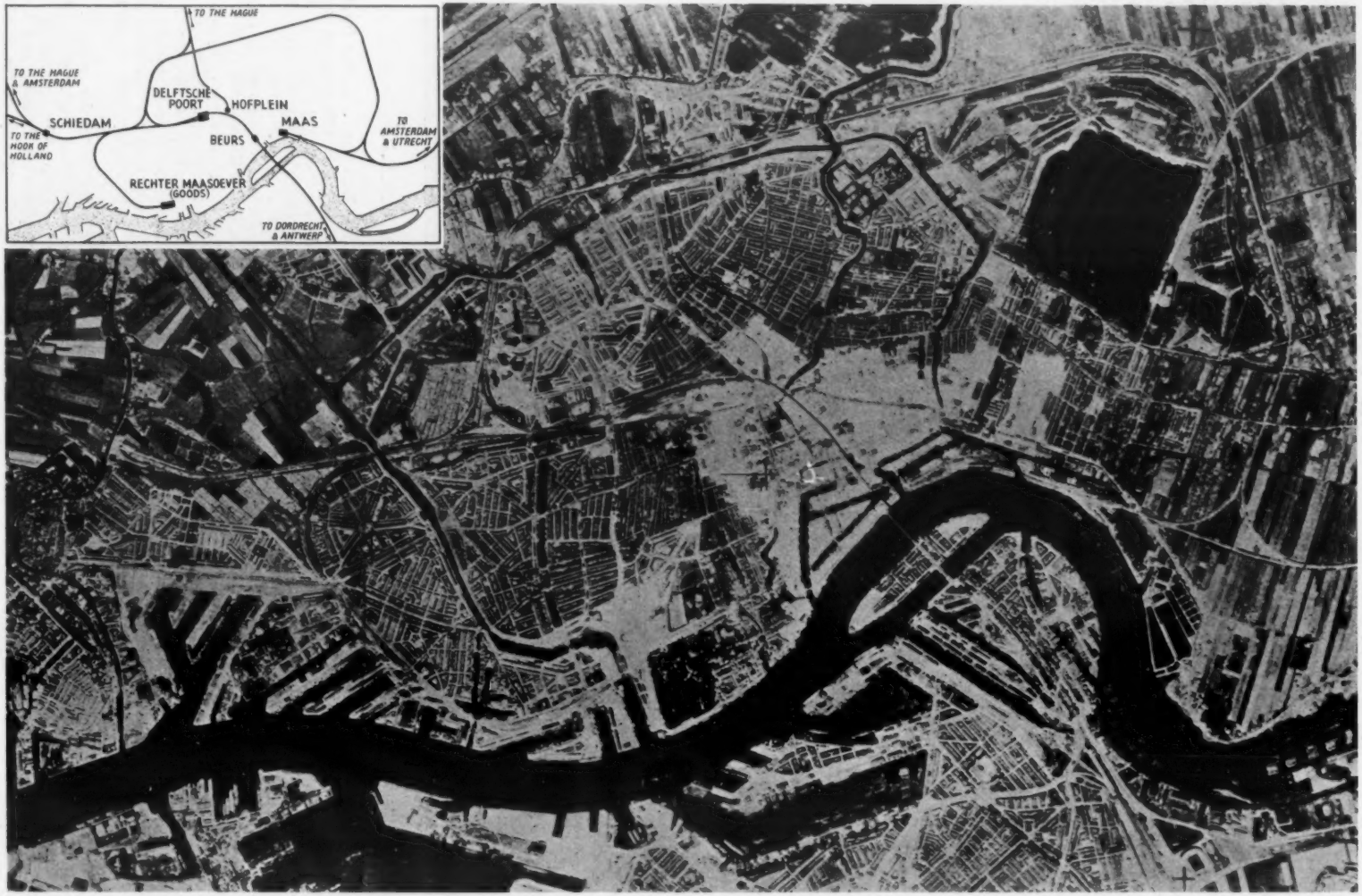


British Oxygen machines at work on a locomotive frame plate in Doncaster works, L.N.E.R.

The standard machine as supplied is capable of cutting steel plate and billets up to 15 in. thick; thicknesses of 24 in. have been successfully cut, using a larger blowpipe. Typical speeds of cutting are: $\frac{1}{4}$ in., 75-105 ft. per hr.; 1 in., 50-70 ft. per hr.; 6 in., 24-28 ft. per hr.; 15 in., 14 ft. per hr. Straight lines and profiles are cut with equal facility and the cut edge is smooth enough to be put into service without further machining unless this is necessary for working parts, etc.

On the wall behind the machines are seen a large number of steel templates. An idea of the varied work on which these machines are employed may be obtained when it is stated that over 1,400 sets of templates are at hand and are more or less regularly used. By fitting any of these, the shapes required can be produced in a very short time, in any desired quantity, and in size identical with each other and with the previous delivery.

* Reproduced by permission of the Chief Mechanical Engineer of the L.N.E.R.



An Air Ministry photograph of Rotterdam showing the area of nearly two square miles in the centre of the city which was bombed by German aeroplanes on May 14, 1940, causing an estimated total of 100,000 casualties among the civilian population of which 30,000 were fatal. The invasion of Holland and Belgium began on Friday, May 10, 1940, and the main Dutch army surrendered after the bombing on Tuesday, May 14. The principal main line railway stations (Delftsche Poort and Maas) as well as the Hague local electric railway terminus at Hofplein, were all damaged, and the Beurs station on the main line through the devastated part of the city to Dordrecht and Belgium was utterly destroyed. Between Delftsche Poort and the River Maas the line is on viaduct, which was sufficiently repaired to permit of reopening for electric train services on June 17. The bombed areas can be recognised in the aerial photograph by their white appearance

Railways and the War—72

The Bombing of Rotterdam

The bombed area of Rotterdam during clearance operations in which 200,000 tons of debris were removed and dumped into the River Schie, one of the waterways through the town. The viaduct behind the ruined Groote Kerk carries the main electrified line between Amsterdam and Antwerp. The Beurs station is just beyond the bowstring girder bridge on the right, and the River Maas beyond that. The town hall lay beyond the viaduct between the Groote Kerk and the Beurs. The old windmill on the Oostplein can be seen beyond the girder bridge

View taken from the tower of the ruined Groote Kerk showing the bend of the River Maas on the right. In this picture the old windmill is seen on the left. Both views are looking eastward

UNIQUE TROLLEY WAGON FOR EXCEPTIONAL LOADS

A sixteen-wheel special vehicle of exceptional dimensions to carry loads up to 150 tons, Victorian Government Railways

IN order to handle alternator stators weighing 117½ tons and 70 tons for the reconstruction of the Victorian Railways electric power station at Newport and the expansion of the associated Newport "B" station of the State Electricity Commission, which is also establishing Newport "C" station, a special all-welded trolley wagon carried on 16 wheels and 150 tons capacity, was designed and constructed at Newport shops during 1940. The vehicle is 51 ft. 9 in. over couplers and its maximum width is 12 ft. 3 in., which exceeds the normal maximum loading gauge by a considerable margin. This fact necessitated pitching the central portion sufficiently high to clear platforms and other lineside structures.

Special high-capacity vehicle for carriage of out-of-gauge loads, Victorian Railways

The central carrying section consists of two specially-designed fabricated side frames cross-braced at each end and intermediately at pivotal points, but giving a clear loading space of 19 ft. 8 in. long by 9 ft. 7 in. wide, from rail level upwards. This frame unit is pivoted at 32 ft. centres. Its length overall is 33 ft. 3 in. At each end and supporting the main frame are auxiliary frames 14 ft. 3 in. long, towards each end of which the bogies are pivoted. At the outer ends of each auxiliary frame the draft gear and automatic couplers are directly attached. There are no headstocks and consequently no side buyers. Flexible hosepipe connections are provided at pivot points for the air brake train pipe.

Each intermediate frame is carried on a pair of cast steel four-wheel standard 44-ton freight car bogies each with a 5 ft. 9 in. wheelbase and spaced at 9 ft. 9 in. centres. The wheels are 36¼ in. dia. with 10 in. × 5 in. journals in plain bearings. A separate brake cylinder operates two pairs of brake blocks on each truck unit through conventional foundation brake rigging.

Despite the wheelbase of 47 ft. 6 in., the vehicle can negotiate curves of 100 ft. radius which will be encountered in placing the equipment in position at Newport power station. The height from rail level to top of central frame is 5 ft. 6¾ in. unladen, giving a clearance under this overhanging portion of between 4 ft. 6 in. to 4 ft. 8 in.; sufficient to clear most lineside structures such as platforms, etc. When loaded the maximum speed of the vehicle is limited to 5 m.p.h. Estimated tare weight is approximately 30 tons, a remarkable figure in proportion to the carrying capacity; the load to tare ratio being approximately 5 to 1. This is largely a result of fabrication by welding and the elimination of all structural parts not necessary for load carrying. When fully loaded the average axle load will be 22½ tons, one ton less than the maximum permitted.

This vehicle shares with a more conventional but similar car on the New South Wales Government Railways the distinction of having the highest capacity of any railway vehicle in Australia, industrial equipment such as hot metal ladles excepted. It can, of course, be used only under special arrangements necessitating clearance of sidings and yards and prohibition of traffic on adjacent tracks.

Remarkable Safety Record in the U.S.A.

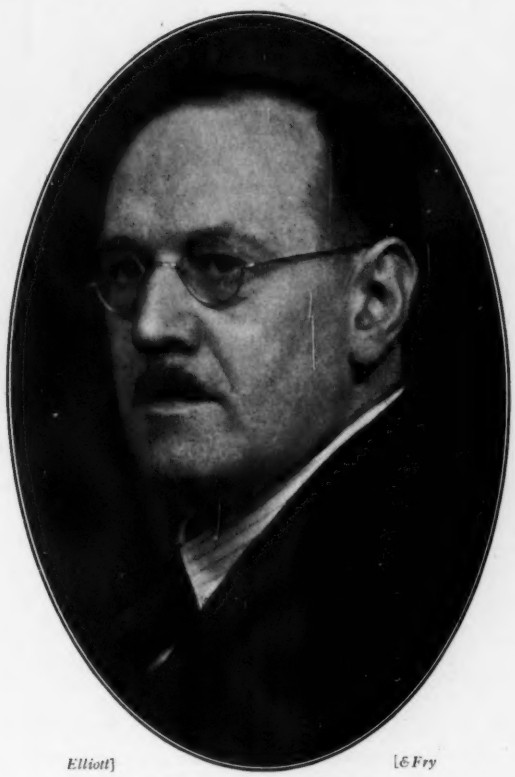
Mr. J. B. Hill, the President of the Louisville & Nashville Railroad, addresses a monthly message to his "fellow employees" in the *L & N Magazine*, and in the February issue he took as his subject safety of both passengers and staff. Concerning the former, he is able to quote the remarkable and enviable record that no passenger has been killed in a train accident on the Louisville & Nashville Railroad for 23 years, and to point out that during that time many more passengers had used the company's trains than there were persons in the U.S.A.; each was carried an average distance of 67 miles. During the same period the company's passenger trains ran a total distance of about 246,000,000 miles, the equivalent of one train circling the earth at the equator nearly 10,000 times. Apart from the risk of failure on the part of staff and equipment, the territory served by this railway has its own particular hazards in the forms of highway level crossings and severe storms. The other side of the picture, as portrayed by Mr. Hill, was less happy, for he showed that the six employees killed and 332 injured during 1939 (which caused the company to occupy tenth place among the sixteen railways systems of its class) rose in 1940 to 11 killed and 415 injured, which made even worse comparison with other similar U.S.A. railways. Obviously carelessness must have played some part, and Mr. Hill concluded with an exhortation to members of the staff to treat their fellow employees with the consideration accorded to passengers.

RAILWAY NEWS SECTION

After suffering from ill-health for some months, Lt.-Colonel H. H. Mauldin, Divisional General Manager of the L.N.E.R. Southern Area, died on May 31, at his home at Old Knebworth, Herts, at the age of 59. "The Colonel," as he was affectionately known to thousands of the staff in East Anglia, took a great interest in staff welfare and was one of the most popular officers of the L.N.E.R. He started his railway career as a junior clerk at his native place, Fakenham, in Norfolk, forty-two years ago and climbed the ladder of promotion to the post of Superintendent of the former Great Eastern Railway. This appointment he received soon after his return from the last war in which he enlisted as a sapper in the Royal Engineers (Railway Troops) in 1915, to reach the rank of Lt.-Colonel as Assistant Director of the Royal Engineer's Stores Directorate after the Armistice, after having served for a considerable period in the R.O.D. in forward areas in France. On the formation of the L.N.E.R. on January 1, 1923, he became Chief Assistant Superintendent, Southern Area, and on September 30, 1927, when the Southern Area was divided into an Eastern and Western Section, he was appointed Superintendent of the former. On February 17, 1939, he was promoted to the post he held when he died. Colonel Mauldin was a Vice-President of the Institute of Transport, and was Chairman of the Operating Superintendent's Conference, Railway Clearing House, for 1933. In December, 1934, the King of Denmark conferred upon Colonel Mauldin the Order of the Knighthood of Danneborg, and in the *London Gazette* of January 3, 1936, it was recorded that the King had been pleased to sanction his appointment as an Officer of the Venerable Order of the Hospital of St. John of Jerusalem. Colonel Mauldin leaves a widow and a son. The latter was also on the L.N.E.R. before the outbreak of war, and now holds a commission in H.M. Forces in the Middle East.

Elliott] [& Fry

The late Lt.-Colonel H. H. Mauldin
Divisional General Manager, L.N.E.R., Southern Area, 1939–1941



Elliott] [& Fry

Mr. F. W. Hawksworth
Appointed Chief Mechanical Engineer, G.W.R.

We regret to record the death on May 31 of Lord Cadman, D.Sc., F.R.S., Chairman of the Anglo-Iranian Oil Co. Ltd., a Director of the Great Western Railway Company, and of numerous other commercial undertakings. Lord Cadman was born on September 7, 1877. He was elected a Director of the G.W.R. in 1930.

Mr. Frederick William Hawksworth, M.I.Mech.E., who has been appointed Chief Mechanical Engineer, Great Western Railway, in succession to Mr. C. B. Collett, O.B.E., who, as briefly announced at page 605 of our May 30 issue, is to retire on July 5, entered the service of the G.W.R. in August, 1898, as an apprentice in the locomotive works. He afterwards served for a period in the testing house at Swindon and was appointed draughtsman in February, 1905. In July, 1923, Mr. Hawksworth was appointed Assistant Chief Draughtsman and in June, 1925, became Chief Draughtsman. He was appointed Assistant to the Chief Mechanical Engineer at the beginning of 1932 and has held that appointment until the present time. Afterwards, at the Royal College of Science, he obtained first-class honours in machine design. For many years he has taken a keen interest in the Swindon Technical Institute, teaching various engineering subjects and subsequently assuming responsibility for the organisation of machine-drawing and design classes.

Mr. Allan S. Quartermaine, M.C., B.Sc., M.Inst.C.E., Chief Engineer, Great Western Railway, has been elected a Member of the Council of the Institution of Civil Engineers.

Sir William Valentine Wood, who has been appointed President of the Executive, L.M.S.R., was born on February 14, 1883, the son of the late Mr. George Wood of Belfast. He was educated at the Methodist College, Belfast, and entered the Accountants Department of the former Belfast & Northern Counties Railway in 1898. This undertaking was acquired by the Midland Railway of England in 1903, and he continued to serve in the Accountant's Department of the Northern Counties Committee of that railway. When the Government took control of the Irish railways in 1917 he was appointed Secretary and later a member of the Railway Accountants Committee set up by the Irish Railway Executive Committee. On the formation of the Ministry of Transport in 1919 Mr. Wood (as he then was) was transferred to London as Director of Transport (Accounting) to the Ministry of Transport, and in 1921 became Accountant to the Ministry. In 1924 he returned to railway service as Assistant to the Accountant General of the L.M.S.R., and was appointed Controller of Costs and Statistics in 1927, the position he vacated in January, 1930, to become Vice-President, Finance & Service Department. As Senior Vice-President of the Executive of the L.M.S.R., he was created a Knight Bachelor in the Coronation Honours List in May, 1937, and was knighted by the King at Buckingham Palace on June 11 of that year. On numerous occasions he has given evidence on behalf of all the main-line railway companies before Parliamentary Committees, the Railway Rates Tribunal, and National Wages Tribunal He is recognised as an authority on railway finance, and in collaboration with the late Lord Stamp was responsible for the preparation of the small volume, "Railways," in the Home University Library. From 1926 to October, 1936, he was a member of the Railway Statistics Committee, and was Chairman of it from 1930 onwards. He served as Chairman of the General Managers' Conference, Railway Clearing House, for 1933 and again for 1937, and in 1934 was Chairman of the board of management of the Railway Benevolent Institution. In November, 1930, he was elected Honorary Librarian of the Institute of Transport and became a Vice-President of the institute on October 1, 1934. He has made several valuable contributions to the institute's proceedings. In 1937 Sir William Wood was appointed to the Executive Committee of the Decimal Association, which numbers among its members prominent industrialists and leading figures in every section of the community, and carries out service in different branches of British industry to determine the savings which could be effected by a decimal coinage and a metric system of weights and measures in Great Britain. On September 1, two days before Great Britain became involved in the present war, the Minister of Transport made an Order taking control of all the principal railway undertakings in Great Britain and appointed the Railway Executive Committee to be his agent for the purpose of giving directions under the Order. Sir William Wood was one of the original members of that committee, and it is understood that he has taken a prominent part in these deliberations.

Sir William V. Wood

Appointed President of the Executive, L.M.S.R.

The Hiawatha express of the Chicago, Milwaukee, St. Paul & Pacific Railroad, leaving Milwaukee headed by one of the 4-6-4 streamlined locomotives specially designed for working heavy high-speed trains. This train makes the 410½-mile journey between Chicago and St. Paul in 6¼ hr., all stops included, which entails running for considerable distances continuously at over 100 m.p.h. Self-recording speed indicators are, of course, installed on the locomotives and a careful check of the tapes is made. The fastest point-to-point Hiawatha schedule is from Sparta to Portage, 78·3 miles in 58 min., or 81·0 m.p.h. start to stop. In this stretch are included several speed restrictions

TRANSPORT SERVICES AND THE WAR—93

Lease-and-lend in 1798—Air Raid casualties in March—German Invasion Transport—Iranian railway progress—Higher Fares in Bohemia & Moravia—Railways in Switzerland—German Wagon-Building Industry

In the report of the Public Archives of Canada for 1940 is a series of letters exchanged between United States and British authorities which show the goodwill that prevailed not long after the Revolution. The documents show that in 1798 Great Britain, through the agency of Canada, lent guns and shot to the United States, " preceding therefore by 143 years the lease-lend system recommended by President Roosevelt." In 1798 there existed between France and the United States a state of hostilities, historically known as the " naval quasi-war." This condition arose from depredations committed by French ships on American merchantmen, from which the French seized English goods. France then regarded as lawful prize any enemy merchandise found on neutral vessels. In view of this policy President John Adams ordered the American Navy to capture French armed ships. He also addressed the British Ambassador, Robert Liston, suggesting the sale, loan, or gift to the United States of certain French guns which were being stored in Halifax. Prince Edward, the Duke of Kent, Commander-in-Chief of the British forces in Nova Scotia, accordingly consented to lend to the United States the 24 guns and 1,800 shot, on condition that the United States would return them to any place designated by Britain, any used shot to be replaced by an equal number of others. On October 3, 1798, the agreement was signed and in November the guns (actually 25, with 1,876 shot) were consigned to an American warship and transported to Charleston, South Carolina. This act of friendship did not end there, however, for King George III, on being informed of the facts, decided, in January, 1799, to set aside the contract and to make a present of the munitions " as evidence of his goodwill towards the United States."

March Air Raid Casualties; Corrected Figures

The Ministry of Home Security has issued the following corrected figure of air raid casualties for March, as numbers of persons listed as injured and detained in hospital were actually slightly injured. The total of injured and detained should therefore be 4,794 instead of 5,557, made up as follows: Men, 2,661; women, 1,730; children, 403. The original statement was included in our April 11 issue (page 431).

German Invasion Transport

According to an article by Wythe Williams in the American paper, *Liberty*, for March 29, quoting an alleged secret German document dated December 1, 1940, describing preparations for the invasion of Britain, both railways between Oslo and Trondheim in Norway were then in full operation. The coastal lines which were destroyed at the time of what is described as the " English invasion " of Norway were also operating normally. The new line from Trondheim to the north was carrying freight traffic as far as Bodö. The highway between Bodö and Narvik was completed, except for the embankment link across the Ousfjord and the Tysfjord. The harbour of Narvik and the ore railway had been restored. In Holland the installation of new communication facilities was said to be progressing rapidly. A tribute was paid to the O.T. (*Organization Todt*) for " a remarkable job of reconstruction on the system of Belgian railroads and highways, as well as in the new construction of bombproof underground storage facilities."

With reference to French communications the document stated that, because of their general breakdown, the contemplated October offensive against England had to be abandoned. Then followed the wholesale requisitioning of French rolling stock for increased services to Italy. Much of this rolling stock was still away, but the Reich Ministry of Transport had been instructed that all the French rolling stock was to be returned before the end of 1940. Unless this could be done, offensive preparations along the French sector could not be completed in accordance with the schedule. The three bottlenecks of this region were the railway centres at Metz, Nancy, and Lille, where large quantities of offensive supplies had accumulated. Even the restoration of the Rhine bridge into Strasbourg would avail little unless sufficient rolling stock was made available.

The use of motor transport throughout occupied France was complicated by the fuel problem, it was stated. The booty in motor vehicles had been beyond all expectations, but French- and American-made engines were not adaptable for diesel fuel and it was found unadvisable to release the quantities of petrol that would be required. While the increased production of Roumanian oil refineries was expected to relieve the situation to some extent, the French railway system would be indispensable for the transport of heavy goods.

There were considerable accumulations of rolling stock at various points in unoccupied France, and when large quantities of that in the north of France were requisitioned for Italian deliveries, it was assumed that rolling stock from the south would be made available in replacement. This, however, met with serious obstruction, for such deliveries were not included in the original armistice terms, and the Vichy Government, while acceding to some demands, was consistently hedging on the question of others.

The disorganisation of the communication system of unoccupied France was such that it was extremely doubtful if it could be straightened out by French efforts alone. Rolling stock had been " heaped up in blind alleys (*Sackgassen*) " from which it could be extricated only with great difficulty. Conditions in the Lyons bottleneck were said to be beyond description, and a great deal of the rolling stock accumulated there was in bad condition. The principal railway shops being in occupied France, it was impossible to keep pace with repairs. Breakdowns along the Lyons—Châlon and the Lyons—Besançon lines were of almost hourly occurrence, and it became almost impossible to move anything out along these routes. The only really dependable north-south artery was the Paris—Orleans main route through Angoulême, though its through capacity was limited. Further it served as the only route for supplying the German southern naval bases on the Atlantic coast and for direct German communication with Spain.

The report went on to mention the difficulties of getting French industry in the occupied area into efficient production. The same difficulties with which French war industry had to contend before the French defeat were still not overcome, largely because too great a proportion of French skilled workers had been drafted into the armed forces and great numbers of these were now prisoners of war.

Railway Progress in Iran

By reason of its peculiar topographical situation, Iran has been off the world trade routes for many years and virtually secluded. It consists mainly of a great plateau with several open fertile valleys running from east to west and is hedged about with natural obstacles making ingress from without difficult. With the accession of His Imperial Majesty Risa Shah-Pahlevi, however, an important policy of transport development was begun, consisting initially both of the construction of a system of trunk roads and also the completion of preliminary work required for a Trans-Iranian Railway linking the Persian Gulf with the Caspian Sea, so as to bring foreign trade into the heart of the country and also to provide a through route from central to south Asia.

From the beginning it was intended that this policy of railway construction should not be confined to the Trans-Iranian

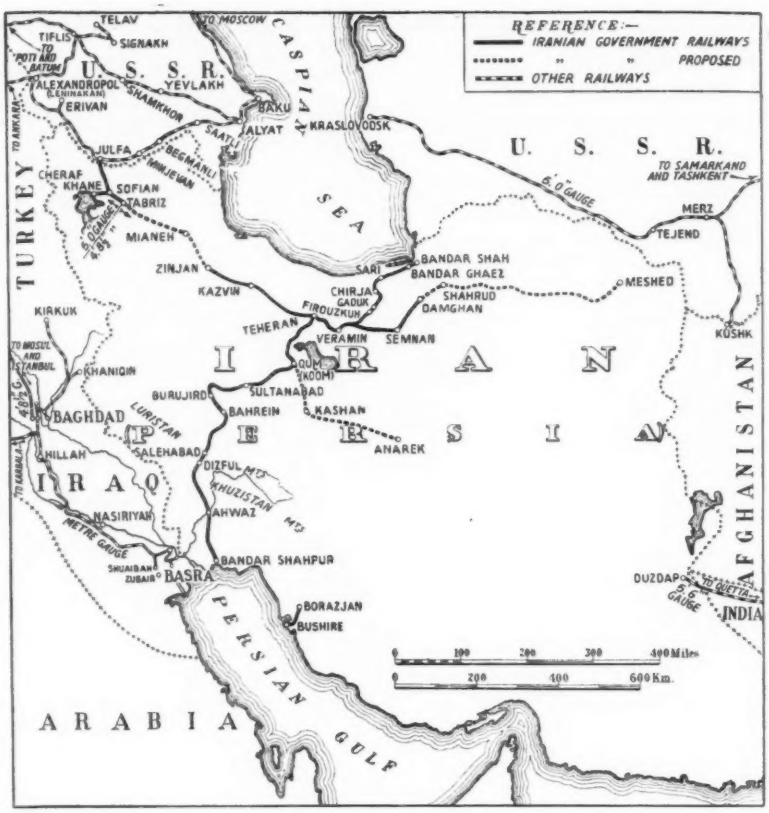
line, but that, as soon as this was completed, new railways should be undertaken from Teheran to Tabriz in the west and also to points in the east. The construction of the Trans-Iranian Railway involved very heavy engineering works and these have formed the subject of a number of articles in our columns on various occasions. In particular we would refer to those in our issues of July 26, 1935 (page 145); July 11, 1937 (page 1112); July 22, 1938 (page 165); and July 14, 1939 (page 64).

Naturally the Trans-Iranian Railway, which is some 865 miles in length and extends from Bandar Shahpur (on the Persian Gulf) to Bandar Shah (on the Caspian Sea), was brought into service in sections as they became available. The last section, marking the completion of the line, was formally inaugurated on August 26, 1938, and on the next day the first through train from the Persian Gulf steamed into Teheran. The work had taken about seven years in all and its total cost at completion was estimated at £28,000,000. This great undertaking was financed entirely by Iran.

The next step in the scheme for westernising Iran was the beginning of work on the Teheran-Tabriz railway, which will link Iran with the railway system of the U.S.S.R. and indirectly with that of Turkey. Moreover, it is regarded as a section of what is designed eventually to become a great west-to-east chain of railway communications across Iran and joining the Indian railway system, probably at Duzbap on the temporarily-closed extension from Nok Kundi of the railway from Quetta. The first section of this line, from Teheran to Karedj, was completed in September, 1939, and the second section, onward to Kazvin, in March, 1940. Thereupon the Prime Minister of Iran officially opened the first 90-mile length of the railway, namely, from Teheran to Kazvin, and at the latter point distinguished guests who had travelled from the capital by special train were entertained to lunch. It appears that passenger trains over the Teheran-Kazvin section began regular service on July 8, 1940. Trains are stated to leave each terminus on Mondays and Thursdays, and in addition a special train runs between Teheran and Karedj twice every Friday. By June 23 construction had been completed for 227 km. (141 miles) from Teheran, namely, as far as a point known as Khorram-Derreh.

At the end of July, 1940, an Iranian delegation headed by the Director-General of the Ministry of Foreign Affairs visited Moscow to confer with Soviet representatives on the regulation of transport and transit affairs over Iranian and Soviet railways under the provisions of the Commercial Treaty between Iran and the Soviet Union. In March of last year, when the Kazvin extension was completed, it was not expected that the section from Kazvin to Zinjan could be finished before January, 1941; but by laying an average of 800 m. (875 yd.) of rail a day, it was found possible to advance the date by about three months, and the line to Zinjan, some 315 km. (196 miles) from Teheran, was opened on October 4, 1940. As in the case of the earlier sections, the line to Zinjan was built by the Iranian Ministry of Communications through contractors for separate sections, under the supervision of both foreign and Iranian engineers.

As far as Zinjan the rise from Teheran is gradual and no severe engineering difficulties were encountered, but the remainder of the line to Tabriz involves much more difficult construction. At page 571 of our issue of May 23, however, we recorded that construction on this north-western section of the line is proceeding rapidly. In the mountainous region between Mianeh and Tabriz two tunnels each about 650 yd. in length have already been completed, and work on several others—including one 1 mile 100 yd. long—is continuing satisfactorily.



Railway map of Iran

As will be seen from the above map, there will be a break of gauge at Tabriz, where the new line will meet the Azerbayejan Railway, which extends from Tabriz to Julfa (there meeting the Caucasian Railways at the Soviet frontier), and is built to the Russian gauge of 5 ft. There is also a 5 ft. gauge branch from Sofian to Cheraf Khane, a port on Lake Razaiyyeh.

The Teheran-Meshed Line

Work is also proceeding rapidly on a railway extending east from Teheran, ultimately to connect Teheran with Meshed. This has now been completed as far as Damghan, 363 km., (225½ miles) from Teheran, according to American advices of April last. The line from Teheran to Semnan, a distance of 227 km. (141 miles) was finished during 1939, and the length of the new section from Semnan to Damghan by rail is 136 km. (84½ miles). The rail distance between Teheran and Damghan is 24 km. (15 miles) more than that by road, an increase accounted for by the detour the railway makes by going *via* Carmsar. By road, Semnan is over a third of the way to Meshed. The following eight stations have been constructed between Semnan and Damghan: Mian Darreh, Ab-i-Garm, Gherdad, Haftkhan, Larestan, Banavar, Amravan, and Sarkh Deh. It will probably be several months before the line is open to regular traffic, but in the meantime rail laying as far as Shahrud is being continued actively.

Increased Fares in Bohemia & Moravia

On May 1 passenger fares on the railways of the Protectorate of Bohemia & Moravia were increased; for third class passengers the increase amounted to an average of 15 per cent., and the rise was slightly higher for first and second class fares, and for long-distance supplements. The price of workmen's weekly tickets is stated to be 20 per cent. less than the figure prevailing in Germany. It is said that these increases of fares have been necessitated by the higher wages and salaries now being paid to railway employees.

It is reported that a Government ruling has been issued to the effect that every railway ticket entitles its holder to a seat. If, therefore, he cannot find a seat in the class for which his ticket has been issued, he may occupy a seat in a higher class carriage.

Swiss Summer Train Services

The internal train services of Switzerland have not been seriously affected as yet by war conditions, but on the few lines still worked by steam locomotives a reduction in the number of trains operating will shortly become necessary owing to the difficulty in obtaining coal; at the same time the suppression of certain electrically-operated trains is probable in order to obviate uneconomic locomotive mileage. Meantime, however, the practical cessation of road traffic has compelled the railway administration, despite difficulties, to keep a full normal timetable in operation. The light high-speed trains on the Geneva—Lausanne—Berne—Zurich and Geneva—Lausanne—Neuchatel—Bienne—Zurich routes continue to operate. Also the Simplon-Orient Express continues to run, but leaves Lausanne at 7.15 instead of 6.40 a.m., in order to connect with the 6.33 a.m. high-speed service from Geneva; on its westbound run it is an hour later than normally. Between Switzerland and Italy four trains in each direction daily are being worked over the Simplon route (three with Lötschberg connections), and six southbound and five northbound services over the Gotthard *via* Chiasso. An understanding reached between the Swiss Federal Railways and the French S.N.C.F. envisaged the maintenance of three pairs of trains daily to and from French territory *via* Geneva, two *via* Delle, one *via* Vallorbe, and one *via* Pontarlier, all of which are shown in the Swiss summer timetable, but the position at Delle, Vallorbe, and Pontarlier is still very uncertain. Communications with Germany include three daily services in each direction *via* Basle, one *via* Schaffhausen, two *via* St. Margrethen and Bregenz, and one *via* Buchs and the Arlberg, but no through coaches are being run, and the steamer services across the Lake of Constance remain suspended. Various daily duplications of important local services in Switzerland are to continue until October 4, and new services include a pair of light fast trains in the upper Rhine valley between Coire, St. Margrethen, and St. Gall.

Bombs on Swiss Railways

The January issue of the *Bulletin des C.F.F.* describes the results that occurred on the three occasions during the war when bombs have been dropped by foreign planes on Swiss railway installations. In the early stages of the war the station at Rénens (junction of the Geneva and Vallorbe lines to the west of Lausanne) was bombed, and since then bombs have fallen at Basle and Zurich. The former, three in number, fell on the night of December 16, and damaged certain railway offices, the track, and overhead equipment, and about fifty coaches, twelve seriously, but caused no personal injuries. The bombs at Zurich, six nights later, were more numerous; here the worst railway casualty was a brick viaduct on the Zurich—Oerlikon line, which was damaged by bombs falling on each side of it, and three hours later had an arch destroyed by the explosion of a delayed action bomb. The latter seriously injured four railwaymen who were working with a gang to restore the damaged track.

The Wagon-Building Industry in Germany

Some indication of the position of the railway wagon-building industry in Germany is given in the annual report of the Westdeutsche Waggon-Fabriken A.G., of Cologne, for the year ended June 30, 1940, which has recently reached this country through American sources. This indicates that the company has found it necessary to meet a great and varied demand for all types of road and rail vehicles. Orders are reported to have included railcars, and passenger and freight vehicles of all types. The special needs of the Reich war economy, however, are said to have made it necessary to change, toward the end of the year, to a programme devoted exclusively to freight wagons. The stock of orders on hand was somewhat reduced in the period ended June 30, 1940, but was still sufficient to keep all the shops busy at full capacity for a long time. The turnover of the past business year, it is reported, represented an increase of about 10 per cent. in comparison with that of the year before. An extensive building programme including the modernisation of the workshops, which had been inaugurated a few years ago, could be continued only in part. Preparations were carried on, it is claimed, for a future execution of the programme. The capital which will eventually be necessary to carry out this building programme at the works has, it is stated, been put aside and is being held, as far as possible, in the reserves of the company.

Rationalisation of construction at the various works has been the object of special study and has resulted in a distribution of specialised tasks among the several plants. While meeting their present construction programme, engineers at the Deutz factory are said to have been busy drafting the plans for new types of freight cars, especially for a larger type to be known as the *Grossraum-Wagon*. The workshops at Mainz have devoted special attention to the development of mail cars for the service of the Reich Post Office Department. A bank debt to the amount of RM. 3,640,000, which appeared in the balance reported by the firm for the preceding year, has now been paid off. For the first time in several years, profits amounted to sufficient to permit paying a dividend of 5 per cent. The company's share in the H. Fuchs Waggonfabrik A.G., of Heidelberg, which amounted to RM. 1,971,900 out of a total capital of RM. 2,000,000, changed hands during the year, and is now in the possession of the Dillinger Huette works.

Railways for U.S.A. Army Training

It was recorded in THE RAILWAY GAZETTE of May 16 that the United States Army was buying the 50-mile line in Louisiana of the Red River & Gulf Railroad for the purpose of training a railway operating battalion. Details were also given of the cost and manner in which the railway would be extended and rehabilitated. Plans have now been announced by the U.S.A. War Department for the formation during this month of the battalion which will occupy the Red River & Gulf Railroad, and thereby test military railway operations under assumed field service conditions. The 711th Engineer Battalion (Railway Operating) will be formed at Camp Claiborne, Louisiana, and will consist of about 20 officers and 750 enlisted men. In addition to utilising the present facilities of the railway, it is proposed to construct 17½ miles of additional line. The Army has especially designed lightweight railway equipment with 20-ton wagons and 30-ton locomotives for use in hastily prepared railways of forward areas, and these will be thoroughly tested. It is stated that volunteer requests of engineer railway reserve officers with the concurrence of railway managements for extended active duty with the battalion are being received in adequate numbers. After a brief course at the Engineer School at Fort Belvoir, Virginia, the officers selected will serve one year with the battalion.

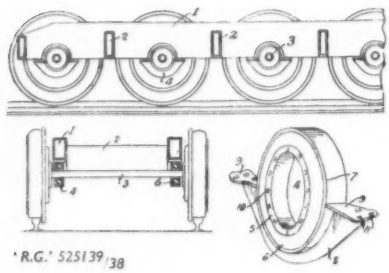
During the last war, railway operating, construction, maintenance, and shop units were formed from many experienced railwaymen in the United States, transported to France, and assigned on the railways allocated to the American Expeditionary Force. At that time, there were many railwaymen of an age and physical condition suitable for military service. A study made in 1938 by the Bureau of Research & Information Service of the United States Railroad Retirement Board indicates that the average ages of the various railway occupational groups vary from 33 years for maintenance-of-way extra-gang men, to 55 years for enginemen and guards. Although it is expected that the railways of the United States will be able to provide enlisted nuclei for military railway units, it is apparent that a great many men with limited or no experience will have to receive training for various railway duties. The War Department has explained that the organisation of a railway operating battalion is based on the personnel of a division of a commercial railway, and includes: a headquarters, corresponding to a divisional superintendent and his staff; a headquarters and service company to provide for administration, planning, supply, dispatching, signal maintenance, and messing along the lines; a maintenance-of-way company to repair and maintain bridges, buildings and track, a maintenance of equipment company to effect running repairs to locomotives and wagons; and a transportation company to operate the trains and provide shunting service.

ABSTRACTS OF RECENT PATENTS*

No. 525,139. Vehicle Suspension

Michelin & Cie., of Clermont Ferrand, Puy de Dome, France. (*Convention date : April* 15, 1938.)

For a rail vehicle having pneumatic tyres the bogie chassis is built up of longitudinal frames 1 spaced apart by means 2, each axle 3 being solid, with a suspension member 4 which consists of an outer steel housing 7 separated from an inner bearing rung 5 by a rubber annulus 6 which is secured to the housing 7 and the bearing 5 by vulcanisation. The inner ring 5 carries the axle 3 which are secured by screws in holes 10. Ribs 8 reinforce the housing 7, the housing having brackets 9 with holes 11 for bolts for securing to



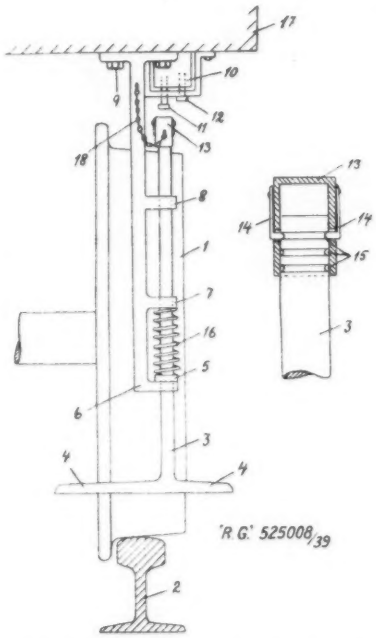
'R.G.' 525139/38

the longitudinal 1. The rubber annular blocks 6 are so arranged as to limit vertical displacement of the axles 3, so that, in the event of deflation of a wheel tyre, its load will be transferred to the remaining wheels. In a modification there is two-point suspension for each axle end. With the suspension described appreciable vertical flexing of the tyres is possible, and, in consequence, blows fatigue the cover less which is no longer pinched between the rail and the usual security arrangement.—(*Accepted August* 22, 1940.

No. 525,008. Derailment Signalling

Karl Holger Winbladh, of Box 503, *Krylbo, Sweden.* (*Application date : February* 11, 1939.)

A device for signalling derailment of railway carriages consists of a circuit-breaker 10, on the bottom of each carriage 17, the circuit-breaker 10 being operated by the action of a rod 3 on the button 11, and the rod 3 having arms 4 extending over the rail 2. The rod 3 is slidable in lugs 7, 8 of a support 6 which is secured to the carriage 17 by bolts 9. The top end of the rod 3 has a cap 13 for co-operation with the button 11, but is normally held away therefrom by the action of a spring 16 on a collar 5 of the rod 3. This cap 13 has springs 14 which engage in any of the grooves or channels 15 according to the required position of the cap 13 on the rod 3. A chain 18 prevents loss of the cap 13 during adjustment. Should a carriage wheel 1 become derailed, the carriage 17 falls and the rail 2 engages the arms 4, thus pushing the rod up with respect to the carriage to operate the button 11 of the circuit-breaker 10. The circuit-breaker 10 may be connected with a bell in the driver's cabin, or with the motors



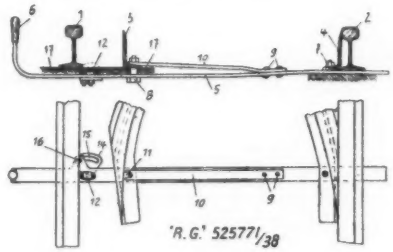
'R.G.' 525008/39

which drive the train, or with the brake mechanism. The circuit-breaker may be reset by the operation of a button 12.—(*Accepted August* 20, 1940.)

No. 525,771. Points

Günther Bischoff, of Mydlinghoven, Post Hubbelrath, Kreis Mettmann, Germany, and Fritz Nieberding, of Bettinaplatz 68, *Frankfurt a. Main, Germany, both of Bischoff, K.-G., of Hermann-Göring-Ufer* 82, *Frankfurt a. Main, Germany.* (*Convention date : February* 28, 1938.)

A point or switch for light railways has a rod 5, connecting the tongues 3, 4, which is extended on one side to form a handle 6. On the same side as the handle 6 the connection between the rod 5 and the tongue 3 permits movement in a vertical plane against spring action. The stock rails 1, 2 are secured to the switch sleeper 17. By means of a bolt 7 the tongue 4 is secured to the rod 5 with little play whereas the bolt 8 has a long shank so that the rod 5 can be moved downwardly in resilient manner. Riveted to the rod 5 at 9 is a blade spring 10 which holds the rod in the upper position, the slotted end 11 embracing the bolt 8. An abutment cam 12 is secured to the rod 5, this cam bearing against the foot of rail 1 in the position shown. In the other position the cam 12 bears against the outside of the rail 1, urging tongue 3 against this rail and tongue 4 away from rail 2. The cam 12 is secured to a pin 13 which passes through the rod 5 and the other end of which has a square head. Mounted at this end of pin 13 is a plate 14 with an arcuate slot 15. A bolt 16 is used to clamp the cam 12 in the desired position by passing through slot 15 and engaging in rod 5, thus clamping the plate 14 to the rod 5.—(*Accepted September* 4, 1940.)

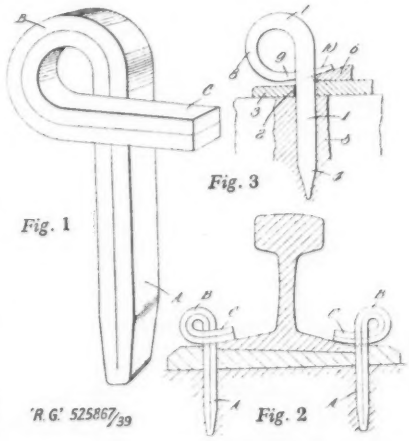


'R.G.' 52577/38

No. 525,867. Rail Spikes

Elastic Rail Spike Co. Ltd., of Cory Buildings, 117, *Fenchurch Street, London, E.C.*3. (*Convention dates : April* 16, 1938, *and April* 10, 1939.)

A resilient rail spike has a loop portion *B* at the top of the shank *A*, the loop terminating in an arm *C* which is adapted to bear resiliently on the rail flange. Fig. 2 shows the ordinary way of using such spikes, the left-hand spike having been driven in to its final



'R.G.' 525867/39

Fig. 3

Fig. 1

Fig. 2

position, and the right-hand spike having been driven in until the arm *C* contacts the foot of the rail. Fig. 3 shows one other method of using such a rail spike, in which the shank 1 fits into square holes 2 such as are usually provided in a tie-plate 3 and holes 4 preformed in a tie or sleeper 5. The loop 7 is tapered at 8, 9 and 10, the part 10 pressing down firmly on the rail foot 6. In some forms the spike is

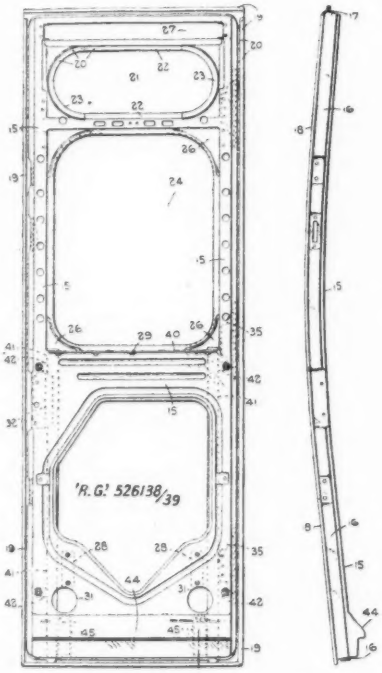
* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each.

laminated, as indicated in Fig. 1, but in other forms the spike is solid metal. In another form of spike the loop is split into two loops, that is to say, the loop is forked.—(*Accepted September* 5, 1940.)

No. 526,138. Vehicle Doors

Fisher & Ludlow Limited, of Albion Works, Rea Street, Birmingham, 5, *Warwickshire, and James Percival, of the company's address.* (*Application date: March* 9, 1939.)

An all-steel door for a railway passenger vehicle consists of an inner panel 15 with edge flanges 16, which are outwardly flanged at 17 for attachment to the outer panel 18 by turning the edges 19 of the outer panel over the edges 17 of the inner panel and by spot welding through the overlapped flanges at 20. A ventilating opening 21 is

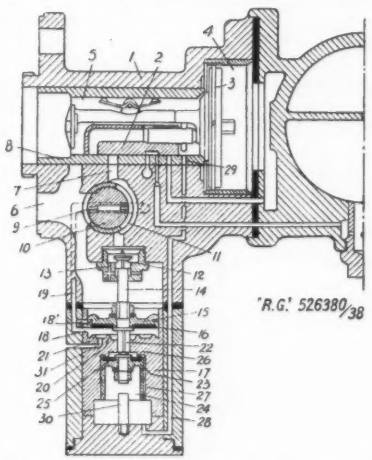


formed by flanges 22 of the panel 15 and separate pressings 23, all these being spot welded at 20 to the panel 18. There is also the window opening 24 formed similarly to opening 21, with separate pressings 26, and a flanged or plunged hole 27 for a blind. Brackets 28 form stops for the sliding window. Caged nuts 29 may be used to attach covering or trim panels. Holes 31 allow access to the window lift mechanism. Internal reinforcement 32 is provided near the door lock and handle, and pressings 35 reinforce at the hinges. A flange 40 is formed in the opening 24 for the attachment of a garnish rail. Channels 41 secured to stirrups 42, form guides for the window and perhaps also gutters for rain water. A lower kick rail 44 is formed integral with the panel 15, and brackets 45 in the recess thereof serve to anchor the mounting rail of the lazy tong or window lift or retaining mechanism.—(*Accepted September* 11, 1940.)

No. 526,380. Hydraulic Brakes

Westinghouse Brake & Signal Co. Ltd., of 82, *York Way, King's Cross, London, N.*1. (*Convention date: March* 17, 1938.)

A distributing valve for controlling fluid flow to and from fluid-pressure brake cylinders of the two-stage brake application type, consists of a casing 1 containing a slide valve 2 operated by a triple valve piston 3 connected on one side with brake pipe 4 and on the other side with valve chamber 5 at the auxiliary reservoir pressure. Slide valve 2 controls communication between passage 6 (leading to the ordinary brake cylinder) and chamber 5 (to effect application of brakes), and between passage 6 and a triple valve exhaust port (to effect brake release). Permanent communication is maintained between brake cylinder port 7 in



slide valve seat 8, and passage 6, through a restricted port 9 in a rotary plug cock 10, and between port 7 and the space above a regulating valve 12 through a wide port 11. In its open position valve 12 establishes communication between port 7 and passage 6, such communication being permitted through port 9 and a restricted port 13 when the valve is closed. Valve 12 has a stem 14 secured to a piston 15 which has a sealing gasket 16, and the piston moves in a cylinder in a plug 17, ports 18, 18 leading through passage 19 to an auxiliary brake cylinder. This cylinder has ribs 20, 21 which are engaged by gasket 16 in the lowermost position of piston 15. The piston 15 has a lower stem 22 abutting against another piston 23 which moves in a cylinder 24 and has a sealing gasket 25 which engages a rib 26 when piston 23 is in its uppermost position. A leakage groove 27 is provided in the piston 23, and a passage 28 provides communication between cylinder 24 and a port 29. For defining the lowermost position of piston 23, a rod 30 is provided. The drawing shows the release and running position. When brakes are applied, by reduction of brake pipe pressure, piston 3 and slide valve 2 move so that port 29 is covered, fluid under pressure flowing from chamber 5 through ports 7, 11, past valve 12 to passage 6 leading to the brake cylinder, and also passing through restricted ports 9, 13. When pressure in passage 6 and the brake cylinder reaches a value dependent on the relative areas of pistons 15, 23, this pressure overcomes that in cylinder 24 to move piston 15 downwards to its lowermost position, and permit valve 12 to move to its closed position, fluid flowing only from passage 7 to passage 6 through restricted ports 9, 13. Fluid under pressure now flows also to the auxiliary brake cylinder through port 18 and passage 19.—(*Accepted September* 17, 1940.)

COMPLETE SPECIFICATIONS ACCEPTED

525,285. Young, E. M. Heaters for use in railway carriages and other living-spaces.

525,356. Scoffin & Willmott Limited and Higgs, E. S. M. Trucks, bogies, and the like.

525,633. Overton, W. Fastenings for sliding-doors on vehicles.

525,692. Compagnie des Surchauffeurs S.A. Steam engine.

525,771. Bischoff, G., and Nieberding, F. Switches for light railways.

525,856. Barker, G. G. (Locomotive Firebox Company). Locomotive boiler fireboxes.

525,858. Hill, C. T. Suspension system for vehicles.

525,867. Elastic Rail Spike Co. Ltd. Rail-fastening means.

525,872. Livingstone, R., and Anti-Attrition Metal Co. Ltd. Collector-heads or current-collectors for trolleybuses and the like.

526,041. Metropolitan-Cammell Carriage & Wagon Co. Ltd., and Brunton, P. D. Passenger-vehicle bodies.

526,067. Walker, J. H. Truck devices.

526,094. Jones, H. R., and A.C.E. Machinery Limited. Control means for hoists and the like.

526,138. Fisher & Ludlow Limited, and Percival, J. Vehicle doors.

526,264. Gerlach, K., and Bachmann, G. Device for the absorption of kinetic energy.

526,287. Wilmot-Breeden Limited and Patch, A. W. B. Slidable doors.

526,379. Westinghouse Brake & Signal Co. Ltd., Burrows, F. A., and Barty, T. Steam-heating radiators, more particularly for railway vehicles.

526,380. Westinghouse Brake & Signal Co. Ltd. Fluid-pressure braking apparatus.

526,408. Klockner-Humboldt-Deutz A.G. Individual-axle drive for a diesel locomotive.

526,410. Macdonald, S. Steam locomotives.

526,509. Harrison, S., and Foster, H. Buffers for pit tubs or corves.

526,572. Thomson, K. J. (Ponzoni A.G.). Seats for transport vehicles.

526,700. Ellis, L. S. E. (Oil Well Supply Company). Portable steam generators of the locomotive type.

526,729. Banks, F. W. Buffers, bumpers, fenders, and the like.

526,751. Westinghouse Brake & Signal Co. Ltd., Peter, L. H., and Shipp, D. G. Railway traffic-controlling apparatus.

QUESTIONS IN PARLIAMENT

Public Utility Undertakings (War Damage)

Sir I. Albery (Gravesend—Con.), on May 29, asked the Chancellor of the Exchequer when he expected to be able to introduce legislation concerning war damage to public utility companies.

Sir Kingsley Wood (Chancellor of the Exchequer): This is a complicated matter, and a good deal of time has been needed for its examination. I have now framed the general lines of a scheme, but before I can usefully introduce legislation I shall need to assure myself of the practicability of certain aspects of it and to obtain information from representatives of public utility undertakings on a variety of technical matters, on which my present information is incomplete. I propose, therefore, next to ask representatives of the principal public utility groups to meet my advisers and assist me in some of these matters, and I will introduce legislation as soon as practicable thereafter. As the House will no doubt wish to be apprised of the outline of the scheme I have in mind, I will circulate a short statement in the *Official Report*. I need hardly say that the pending discussions will be entirely without prejudice to the right of the House to criticise and amend the proposals which I ultimately lay before it

Sir Herbert Williams (Croydon S.—Con.): When will these conferences commence?

Sir K. Wood: Immediately after the publication—today.

Following is the statement:—

Section 40 of the War Damage Act excluded from the operation of Part I of that Act, which relates to immovable property, public utility undertakings as there defined. Under the War Damage Act separate schemes were provided for immovable and movable property, but in the case of public utility undertakings it is proposed that both classes of property should be included in a single scheme to be administered by the War Damage Commission. It was with this in view that the goods of public utility undertakings were exempted from compulsory insurance under Part II of the Act and the undertakers were advised to defer voluntary insurance.

Where the work necessitated by war damage is in the nature of repair rather than replacement, it is proposed that the war damage payment should be the actual outlay on repair, excluding any outlay resulting from the introduction of improvements. Where, however, a structure or group of structures, or a movable asset, has been damaged beyond repair the war damage payment in the event of replacement will be the net outlay (after elimination of any outlay resulting from improvements), reduced in a proportion corresponding to the degree of depreciation or obsolescence of the old asset. It may be that when an asset is damaged beyond repair, it will not be replaced by one of the same character or size, or, in the case of a structure, on the same site. In such a case it is proposed that the war damage payment shall be such sum, not exceeding the actual outlay, as the War Damage Commission may decide after paying regard to the principles mentioned in the last paragraph so far as they can be applied, and also to the service required to be performed by the undertaking. Where, by reason of redundancy or for other reasons, an asset which has been damaged beyond repair is not replaced at all, it is proposed that a payment in the nature of a value payment should be made. Provision for payment of outlay on temporary measures pending repairs or replacement will be added as in the War Damage Act.

The contributions payable under Part I of the Act on the basis of the Income Tax Schedule A or rating valuation cover war damage to immovable property only. Such a basis is inapplicable to a scheme which covers both movable and immovable property without differentiating between them. There is thus no existing valuation which could be used as a basis of contribution for such a scheme, and *ad hoc* valuation on a large scale would be impracticable in present conditions. It is accordingly proposed that the aggregate contributions of the members of each group of public utility undertakings should be 50 per cent. of the estimated aggregate war damage payments to the members of the group, and that the contributions should be payable in four annual instalments of which the first would be due on July 1, 1942 (such adjustments being made from time to time as may be necessary by reference to successive estimates of the aggregate payments). It is, however, proposed to provide that as soon as may be possible after the termination of the war the War Damage Commission shall, whether on its own initiative or at the instance of the parties, take into consideration the 50 per cent. rate and make a report whether, and if so to what extent that rate should in their judgment be reduced as respects any or all groups of public utility undertakings, having regard to the relative amount of damage suffered and to all other relevant considerations. It is proposed that the aggregate contribution thus due from any group should be divided between the members of the group in accordance with a scheme made by them and approved by the Treasury, or, failing that, as the Treasury may by order prescribe subject to affirmative resolution of the House. These proposals, which apply to the first risk period ending on August 31, 1941, have been framed primarily with reference to the main groups of public utility undertakings. It should not be assumed that they will necessarily be applied to every type of such undertaking covered by the statutory definition and it may be possible to restore one or two of the minor groups within that definition to the ordinary provisions of the War Damage Act.

In addition to public utility undertakings, Section 40 of the War Damage Act refers to other undertakings including those valued for rating on the basis of accounts, receipts, profits or output. Examination of these cases is not yet complete. It is intended in general that these other undertakings shall be dealt with on the basis of the War Damage Act except that where appropriate, provisions on the lines of the scheme for public utility undertakings will be applied. There will, however, be a number of cases where special provision will be necessary in applying Part I of the Act. On the contribution side, mines and certain similar undertakings may require special treatment in view of the fact that existing valuations represent in large measure the value of unworked minerals beneath the surface which are not at risk.

Canals Report

Sir Granville Gibson (Pudsey and Otley—C.), on May 22, asked the Parliamentary Secretary to the Ministry of War Transport whether he had now received the report of Mr. Frank Pick on the traffic which could be conveyed by canals; why the information sought by Mr. Pick was not available at the Ministry; why it was necessary to employ Mr. Pick to collect information which should have been in possession of the Ministry and whether he proposed to publish the report; and what action he proposed to make greater use of canals and inland waterways.

Colonel Llewellin (Parliamentary Secretary to the Ministry of War Transport) in a written reply stated: We have now received Mr. Frank Pick's report. It is not our intention to publish it. Mr. Pick was not appointed to collect information but to suggest ways and means of making better use of the canals. Some steps have already been taken, but it is as yet too early to say what further steps we may take in the light of the report.

Railway Advertisements

Captain A. S. Cunningham Reid (St. Marylebone—C.), on May 29, asked the Parliamentary Secretary to the Ministry of War Transport if he was aware that a British railways' advertisement was appearing in the daily press which read: When trains are late often the cause is this, the work of the Hun, and there also appeared a picture of a railway bridge wrecked by enemy action, and another picture showing the resultant dislocation of our train service; and, as such propaganda was harmful as well as being a waste of railway funds, would he take steps to prevent this sort of advertisement showing the effectiveness of German bombing.

Colonel J. J. Llewellin (Parliamen-

tary Secretary to the Ministry of War Transport): This series of railway advertisements has proved useful in helping the public to realise that there may be reasons outside the control of the railways for the late running of trains. The pictures do not convey any useful information to the enemy and I see no reason to intervene in the direction suggested by my hon. and gallant friend.

Delay in Settling Accounts

Sir Ralph Glyn (Abingdon—C.), on May 27, asked the Financial Secretary to the Treasury whether he would inquire into the abnormal delays that took place in the settlement of accounts with the railway companies, in view of the fact that there was a Treasury order that payment should be made within 21 days of the date of presentation of the account; what were the average delays in payment by the Admiralty, War Office, Ministry of Aircraft Production, and Ministry of Supply; and what was the total amount due to the railway companies from those departments on accounts which were presented over a month ago.

Captain H. F. C. Crookshank (Financial Secretary to the Treasury) in a written reply stated that he was making inquiries into this question and would communicate with Sir Ralph Glyn as soon as possible.

L.N.E.R. Notice

Sir Robert Tasker (Holborn—C.), on May 27, asked the Parliamentary Secretary to the Ministry of War Transport if he was aware that in the notice issued by the London & North Eastern Railway to enginemen and guards, dated April 26, out of eight pages contained in this notice three were blank, the fourth was nearly all occupied by an exhortation to save paper; and would he take action to avoid wasting paper in this manner in future.

Colonel J. J. Llewellin (Parliamentary Secretary to the Ministry of War Transport) in a written reply stated that enquiries were being made and he would communicate with Sir Robert Tasker.

Workmen's Tickets

Sir Waldron Smithers (Chislehurst—C.), on May 28, asked the Parliamentary Secretary to the Ministry of War Transport whether he would make the necessary arrangements with the railway companies for workmen's tickets to be available for 48 hours instead of 24 as at present, especially owing to the fact that in certain factories the hours of work and the carrying out of air-raid precautions, fire watching and other defence duties prevented the holder of the ticket from using the return half within the specified time.

Mr. D. Frankel (Stepney, Mile End —Lab.) also asked the Parliamentary Secretary to the Ministry of War Transport if he was now able to make a statement regarding tram and bus return tickets.

Colonel J. J. Llewellin (Parliamentary Secretary to the Ministry of War Transport): Workmen's tickets, available for return at the end of the shift, though this may be on the day following the date of issue, are available to artisans, mechanics, and labourers on late shifts who produce the necessary certificate from their employers. This applies to the railways and to all forms of transport in London on which workmen's tickets are available. As announced in reply to Questions on January 30 and February 19, special concession fares are available on the railways to full-time Civil Defence Workers and to Fire Watchers.

Essex Railway Services

Mr. T. E. Groves (Stratford—Lab.), on May 29, asked the Parliamentary Secretary to the Ministry of War Transport if he would enquire into the reasons why passengers travelling by workmen's ticket from stations the Southend side of Benfleet, Essex, covering Leigh, Chalkwell Park, Westcliff, Southend, Thorpe Bay, and Shoeburyness cannot purchase a through ticket beyond Barking, necessitating them queueing and purchasing a second ticket, thereby adding to the congestion of people at Barking station.

Colonel J. J. Llewellin (Parliamentary Secretary to the Ministry of War Transport) in a written reply stated that he was making inquiries and would let Mr. Groves know the result as soon as possible.

Parliamentary Notes

Progress of Railway Bills

The London Midland & Scottish Railway Bill passed the Report stage in the House of Commons on May 27, and was ordered to be put down for Third Reading.

The Great Western Railway (Variation of Directors' Qualification) Bill was read a third time and passed in the House of Lords on May 27.

The Railway Clearing System Superannuation Fund Corporation Bill was given a Second Reading in the House of Lords on May 28.

Notes and News

A Record in Travel Enquiry Answers.—An L.M.S.R. employee of Euston Station, whose work consists of answering telephone enquiries, recently dealt with 489 travel enquiries in 7 hours—an average of 70 an hour.

Canadian Tax on Railway Fares.—The Dominion Finance Minister, Mr. J. L. Ilsley, in his recent Budget speech, announced a 10 per cent. tax on rail and air travel tickets costing more than 50 cents. Holders of passes will be exempt from the tax since the levy is expressly made upon purchases of tickets.

British Railways in Wartime.—The success of the exhibition of photographs of British railways in wartime held at Charing Cross Underground Station last year, has prompted British Railways to send it on tour. A mobile art gallery will tour the country, commencing at Liverpool Street next Monday. A full report will be given in THE RAILWAY GAZETTE next week, including a review of a booklet to be sold for wartime charities.

Fire in L.N.E.R. Express.—At the resumed inquest at Grantham on May 28, the Coroner recorded a verdict of " accidental death by burning " in the case of the 6 schoolboys who lost their lives on April 28, when a fire broke out near Claypole, Lincs, in the 12.50 p.m. London—Newcastle express. Earlier evidence given at the opening of the Ministry of Transport Inquiry, conducted by Colonel A. C. Trench in London on May 5, was recorded in our news columns for May 9, 1941 (page 535). Evidence at the inquest showed that at least one of the boys had thrown lighted matches about; several boys were smoking. Some tried to smother the fire with their coats when it was first detected. Mr. T. H. Turner, Chief Chemist, L.N.E.R., said that an amateur chemical set which was found in the debris might have liberated oxygen and thus intensified any fire, but it was not possible to say that it caused a fire. Throughout the investigations no blame has been placed on any railway servant.

British-owned Canadian Pacific Securities.—It is announced from Ottawa that the Finance Minister, Mr. Ilsley, states that no steps have been or are being taken to repatriate Canadian Pacific Railway securities owned in Great Britain.

Railway and Other Reports

Bengal & North Western Railway Co. Ltd.—An interim dividend has been declared for the half-year ended March 31, 1941, of 4 per cent., together with a bonus of 4 per cent. on the ordinary stock (same).

Rohilkund & Kumaon Railway Co. Ltd.—The directors have declared an interim dividend for the half-year ended March 31, 1941, of 4 per cent., together with a bonus of 4 per cent. on the ordinary stock (the same).

Robert Stephenson & Hawthorns Limited.—A dividend of 5 per cent. is recommended for the year 1940, which compares with 4 per cent. for 1939, and 3 per cent. for 1938.

North British Locomotive Co. Ltd.—The directors have decided to distribute four years' dividend arrears on the £750,000 of 5 per cent. preference stock. This will bring the payment up to June 30, 1937.

Railway Stock Market

The stock and share markets have been inactive, awaiting the next turn of events in the war, and the majority of movements in security values were small and unimportant. Re-investment of the further large sums released from the latest requisitioning of dollar stocks assisted British Funds, but at the time of writing, the chief feature has been provided by selective buying of industrial ordinary or equity shares. In most sections of the Stock Exchange, absence of selling was again an important market factor, and as numerous securities were in small supply, prices were inclined to show ready response to only moderate demand. Although some deceased estate selling affected various stocks, home railway prior charges were little changed on balance, and any decline in prices appeared to attract buyers. An easier tendency ruled in stocks of the junior class, despite continued market hopes that interim dividend payments are likely to be unchanged. It is realised, however, that in view of the increased wages award, and rising costs generally, a Government subsidy may be required to maintain the minimum guaranteed revenue. On the other hand, it is recognised that, if the railways are to receive just and equitable treatment, the guarantee of a minimum net revenue of £40,000,000 must remain an essential part of any new or revised financial arrangement with the Government. Moreover, it may be recalled that the original agreement provided for £10,000,000 maximum in respect of war damage, before the guaranteed net revenue came into effect. It should, of course, not be overlooked that in return, railway stockholders have had to give up for the war period, the right to earn standard revenue under the 1921 Act. Bearing in mind all these factors, it is not expected that the principle that each group of public utility and allied undertakings shall pay 50 per cent. of the cost of their war damage, will apply to the railways without important modifications. It still appears, however, that some time may have to elapse before the final decision is known. Furthermore, it is naturally assumed the authorities are bearing fully in mind that the question of war damage, and rising costs generally, have to be considered in relation to the declared policy of the Government of preventing any excessive increase in the cost of living.

As to movements in individual stocks, Great Western debentures were fractionally lower at 111, and the 5 per cent. preference at 99½ was unchanged on balance, as was the ordinary stock at 33. Southern 5 per cent. preference, which continues to be pointed out in the market as moderately priced, was again 93½, and the 4 per cent. debentures 109. Moreover, Southern preferred and deferred were again 50 and 9½ respectively. L.M.S.R. 1923 preference at 38½ was also at the rather lower price made last week; the senior preference eased to 57; and at 12⅛ the ordinary stock was fractionally lower on balance. Among L.N.E.R. issues, the 4 per cent. debentures at par, and the 3 per cent. debentures at 75, were each half-a-point down on the week. L.N.E.R. second guaranteed moved back to 70½, and the first guaranteed to 84. On the other hand, this company's first preference had a firmer appearance at 38, and the second preference remained at 12½. London Transport "C" transferred around 29⅜.

Among the few movements shown in foreign railway stocks, B.A. & Pacific 4½ per cent. debentures were better at 26½, and Central Uruguay 4½ per cent. debentures improved to 47. Central Argentine "C" preference was lower. Canadian Pacific preference remained firm under the influence of the recent decision to repay the outstanding 20-year notes.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1940-41	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1940	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1940	Prices: Lowest 1940	Prices: May 29, 1941	Prices: Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	25.5.41	16,820	— 10	21	363,130	397,300	— 34,170	Ord. Stk.	11½	3½	4¼	Nil
	Argentine North Eastern ...	753	24.5.41	ps. 154,600	— ps.28,700	47	ps. 6,643,200	ps. 7,220,500	— ps.577,300	,,	3½	1	2	Nil
	Bolivar	174	Apr. 1941	3,912	— 738	18	14,932	16,240	— 1,308	6 p.c. Deb.	6½	5	6½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	8	5	5	Nil
	Buenos Ayres & Pacific ...	2,801	17.5.41	ps.1,545,000	+ps.215,000	46	ps.65,880,000	ps. 64,391,000	+ps.1,489,000	Ord. Stk.	4½	1	1⅛	Nil
	Buenos Aires Central ...	190	18.1.41	$70,400	— $20,200	29	$2,477,400	$2,994,900	— $517,500	—	—	—	—	—
	Buenos Ayres Great Southern	5,082	17.5.41	ps.2,304,000	+ps.409,000	46	ps.102,516,000	ps.108,889,000	— ps.6,373,000	Ord. Stk.	10⅛	3	3½	Nil
	Buenos Ayres Western ...	1,930	17.5.41	ps. 900,000	+ps.223,000	46	ps.35,993,000	ps. 36,501,000	— ps. 508,000	,,	8⅜	2	2½	Nil
	Central Argentine	3,700	24.5.41	ps. 2,003,750	+ps.286,250	47	ps.77,035,600	ps. 83,252,950	— ps.6,217,350	,,	8¼	2	2½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4	¼	1	Nil
	Cent. Uruguay of M. Video	972	17.5.41	25,157	+ 417	46	1,055,077	997,601	+ 57,476	Ord. Stk.	3¼	¼	1½	Nil
	Costa Rica	188	Mar. 1941	18,817	— 3,304	39	136,720	158,217	— 21,497	Stk.	23½	14	15½	12⅞
	Dorada	70	Apl. 1941	12,500	+ 900	17	49,200	46,100	+ 3,100	1 Mt. Db	99	97½	98	6⅛
	Entre Rios	808	24.5.41	ps. 203,900	— ps.27,500	47	ps. 9,878,100	ps.11,177,400	—ps.1,299,300	Ord. Stk.	4	½	1½	Nil
	Great Western of Brazil ...	1,016	24.5.41	6,700	— 200	21	207,900	241,700	— 33,800	Ord. Sh.	4/-	1/-	2/6	Nil
	International of Cl. Amer. ...	794	Mar 1941	$487,887	— $103,925	12	$1,444,383	$1,762,134	— $317,751	—	—	—	—	—
	Interoceanic of Mexico ...	—	—	—	—	—	—	—	—	1st Pref.	9d.	9d.	½	Nil
	La Guaira & Caracas... ...	22¾	Apr. 1941	5,915	— 125	18	24,910	28,015	— 3,105	—	6	4	—	—
	Leopoldina	1,918	17.5.41	22,900	+ 589	20	467,780	431,672	+ 36,108	Ord. Stk.	2⅜	¼	⅜	Nil
	Mexican	483	21.5.41	ps. 330,400	+ps. 44,700	21	ps. 6,229,000	ps. 6,208,300	+ ps. 20,700	,,	2/11½	3/8	8/8	Nil
	Midland of Uruguay ...	319	Apl. 1941	11,861	— 851	43	119,846	107,251	+ 12,595	—	—	—	—	—
	Nitrate	386	15.5.41	4,098	— 788	20	38,284	69,911	— 31,627	Ord. Sh.	2¾	1½	2⅜	5½
	Paraguay Central	274	24.5.41	$3,850,000	+ $440,000	47	$153,362,000	$150,775,000	+ $2,587,000	Pr. Li. Stk.	41	36	30½	19½
	Peruvian Corporation ...	1,059	Apr. 1941	68,480	— 5,352	43	£40,466	680,483	— 34,017	Pref.	4	1	2	Nil
	Salvador	100	22.2.41	£26,787	— £17,551	34	£490,660	£615,137	— £124,477	—	—	—	—	—
	San Paulo	153½	18.5.41	40,000	— 1,487	20	721,750	698,570	+ 23,180	Ord. Stk.	50	23	26	7⅞
	Taltal	160	Apr. 1941	2,310	— 775	43	27,450	26,220	+ 1,230	Ord. Sh.	15/1½	⅜	⅜	Nil
	United of Havana	1,346	24.5.41	26,692	+ 2,703	47	1,146,802	1,164,634	— 17,832	Ord. Stk.	⅜	¼	¼	Nil
	Uruguay Northern	73	Apl. 1941	1,009	— 239	43	11,317	11,242	+ 75	—	—	—	—	—
Canada	Canadian National	23,633	21.5.41	1,216,739	+ 300,496	21	21,450,477	16,960,847	+ 4,489,630	—	—	—	—	—
	Canadian Northern ...	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	86	68	92	4⅜
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gr.	105¾	95½	101¼	3⅛
	Canadian Pacific	17,153	21.5.41	874,200	+ 296,000	21	14,956,000	11,384,200	+ 3,571,800	Ord. Stk.	9⅞	4⅜	9	Nil
India†	Assam Bengal...	1,329	—	—	+ —		—	—	—	Ord. Stk.	99⅜	71	100	3
	Barsi Light	202	31.3.41	5,685	+ 2,318	52	167,280	127,072	+ 40,208	—	—	—	—	—
	Bengal & North Western ...	2,086	30.4.41	273,900	— 13,992	4	273,900	287,892	— 13,992	Ord. Stk.	283	234	300	5⅞
	Bengal Dooars & Extension	161	Sept. 1940	14,625	+ 508	46	78,405	66,243	+ 12,162	,,	—	—	—	—
	Bengal-Nagpur	3,269	31.3.41	266,175	+ 11,055	52	8,989,306	8,266,447	+ 722,859	,,	96	83⅛	100½	4
	Bombay, Baroda & Cl. India	2,986	20.5.41	325,050	+ 13,275	7	1,598,250	1,531,875	+ 66,375	,,	108	99	109	5½
	Madras & Southern Mahratta	2,939	31.3.41	212,100	— 17,940	52	6,214,920	5,941,993	+ 272,927	,,	104	97⅛	104½	7⅛
	Rohilkund & Kumaon ...	571	30.4.41	62,775	— 6,683	4	62,775	69,458	— 6,683	,,	284	238	293	5⅛
	South Indian	2,500	31.3.41	143,875	+ 5,550	52	4,605,988	4,134,430	+ 471,558	,,	93¾	83	97½	4⅛
Various	Beira	204	Mar. 1941	73,158	—	26	429,691	—	—	—	—	—	—	—
	Egyptian Delta	610	31.3.41	7,264	+ 1,883	52	245,951	214,172	+ 31,779	Prf. Sh.	7/10½	⅜	⅜	Nil
	Kenya & Uganda	1,625	—	—	—	—	—	—	—	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	53	44½	45½	7¼
	Midland of W. Australia ...	277	Feb. 1941	13,851	+ 1,637	35	119,604	102,871	+ 16,733	Inc. Deb.	88	80	87½	6⅛
	Nigerian	1,900	22.2.41	74,093	+ 16,001	30	2,056,584	1,856,487	+ 200,097	—	—	—	—	—
	Rhodesia	2,442	Mar. 1941	465,823	—	26	2,853,899	—	—	—	—	—	—	—
	South Africa	13,287	19.4.41	698,196	+ 38,957	3	1,964,103	1,837,308	+ 126,795	—	—	—	—	—
	Victoria	4,774	Dec. 1940	1,009,886	+ 65,971	26	—	—	—	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of ⅛ Argentine traffics are given in pesos

† Receipts are calculated @ 1s. 6d. to the rupee